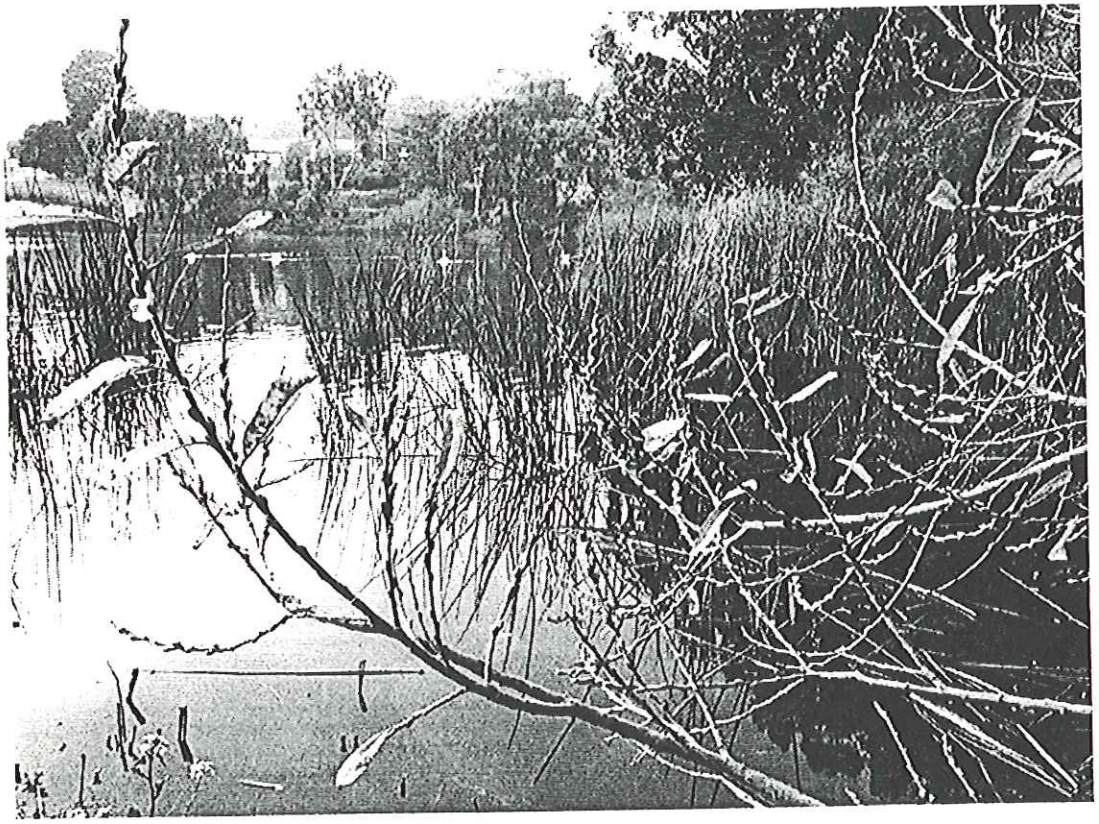
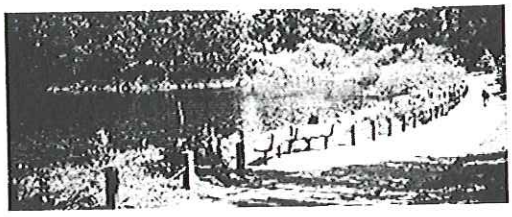
RENEWING MOUNTAIN LAKE



Mountain Lake Enhancement Plan and Environmental Assessment



October 2000

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1. Introduction

The Mountain Lake Enhancement Plan and Environmental Assessment is a cooperative effort between the Presidio Trust (Trust), the National Park Service (NPS), and the Golden Gate National Parks Association (GGNPA). The Presidio Trust is a wholly-owned federal government corporation whose purposes are to preserve and enhance the Presidio as a national park, while at the same time ensuring that the Presidio becomes financially self-sufficient by 2013. The Trust assumed administrative jurisdiction over 80 percent of the Presidio on July 1, 1998, and the NPS retains jurisdiction over the coastal areas. The Trust is managed by a seven-person Board of Directors, on which a Department of Interior representative serves. NPS, in cooperation with the Trust, provides visitor services and interpretive and educational programs throughout the Presidio. The Trust is lead agency for environmental review and compliance under the National Environmental Policy Act (NEPA). GGNPA is administering project funds and coordinating phase one of the project. The San Francisco International Airport has provided $500,000 to fund the first phase of the Mountain Lake Enhancement Plan under the terms and conditions outlined within the Cooperative Agreement for the Restoration of Mountain Lake, 24 July 1998.

The overall goal of the Mountain Lake Enhancement Plan is to improve the health of the lake and adjacent shoreline and terrestrial environments within the 14.25-acre Project Area. This document analyzes three site plan alternatives (Alternatives 1, 2, and 3) and a no action alternative. It is a project-level EA that is based upon the Presidio Trust Act and the 1994 General Management Plan Amendment for the Presidio of San Francisco (GMPA) prepared by the NPS, a planning document that provides guidelines regarding the management, use, and development of the Presidio. The GMPA was analyzed in its entirety in a final environmental impact statement (EIS) that was approved in 1994. The EIS is incorporated by reference into this EA[1]. Each alternative is consistent with the GMPA, as well as the Draft Presidio Vegetation Management Plan (NPS, 2000). Section 2.1.2, Relevant Plans and Policies provides additional information regarding the consistency of the Alternatives with these plans.

Because this EA is tiered from the GMPA EIS, the broader program level analysis contained within the EIS is not repeated in this EA. This EA provides a detailed and focused analysis of the specific issues associated with the enhancement of the Project Area. This EA has been prepared in compliance with the requirements of NEPA and the regulations of the Council on Environmental Quality.

[1] The Presidio GMPA EIS can be viewed at the Presidio Trust, 34 Graham Street, San Francisco, California, or at the GGNRA Park Headquarters, Building 201 Fort Mason, San Francisco, California.

1.1 PURPOSE AND NEED

1.1.1 PROJECT LOCATION

The 14.25-acre Project Area is located on the south edge of the Presidio of San Francisco ("The Presidio"), which is a National Historic Landmark and is a portion of the Golden Gate National Recreation Area (GGNRA; Figure 1). The Project Area falls within two jurisdictions. The majority of the Project Area (13.1 acres) falls within the Presidio, while the southwestern tip (1.1 acres) falls within Mountain Lake Park, which is administered by the City and County of San Francisco (Figure 2). The Project Area includes Mountain Lake, adjacent shoreline and upland areas, a portion of the Juan Bautista de Anza Historic Trail, and a portion of Mountain Lake Park, a developed city park along the south side of the lake.

1.1.2 SITE SIGNIFICANCE

Mountain Lake is one of the few remaining natural lakes in San Francisco and is the only lake within the Presidio (Figure 1). The Project Area is a popular visitor destination with a variety of natural, cultural, and recreational resources.

The Project Area contains open water, wetland, and riparian woodland that support wildlife such as ruddy ducks *(Oxyura jamaicansis)* and the red-shouldered hawk *(Buteo lineatus),* and special status species like the willow flycatcher *(Empidonax traillii)*.

Mountain Lake is historically significant, and is a contributing feature to the Presidio of San Francisco National Historic Landmark District. The Ohlone Indians were the earliest human inhabitants of the Presidio and likely used Mountain Lake as a freshwater resource. A 1776 diary entry from a member of the de Anza expedition contains the earliest written record of the Mountain Lake area. In 1897, the U.S. Army began to use Mountain Lake as a water source for domestic purposes. The Project Area contains one known historic structure, a pump along the east arm of the lake. Excellent opportunities exist to interpret the history of Mountain Lake to the public.

Mountain Lake is a popular destination for visitors, neighbors, and other park users. The lake is easily accessible by foot, bicycle, and public transportation. Visitors engage in many activities at the lake including hiking, jogging, dog walking, bird watching, and picnicking. A portion of the Juan Bautista de Anza Historic Trail runs through the Project Area, along West Pacific Avenue (Figure 2).

1.1.3 NEED

The overall need for the Mountain Lake Enhancement Plan is to improve the biological health of Mountain Lake and to protect, and where appropriate, enhance the recreational, cultural, and historic resources of the Presidio. The following sub-sections briefly describe the need for the Mountain Lake Enhancement Plan. These issues are discussed in greater detail in Section 2, Affected Environment.

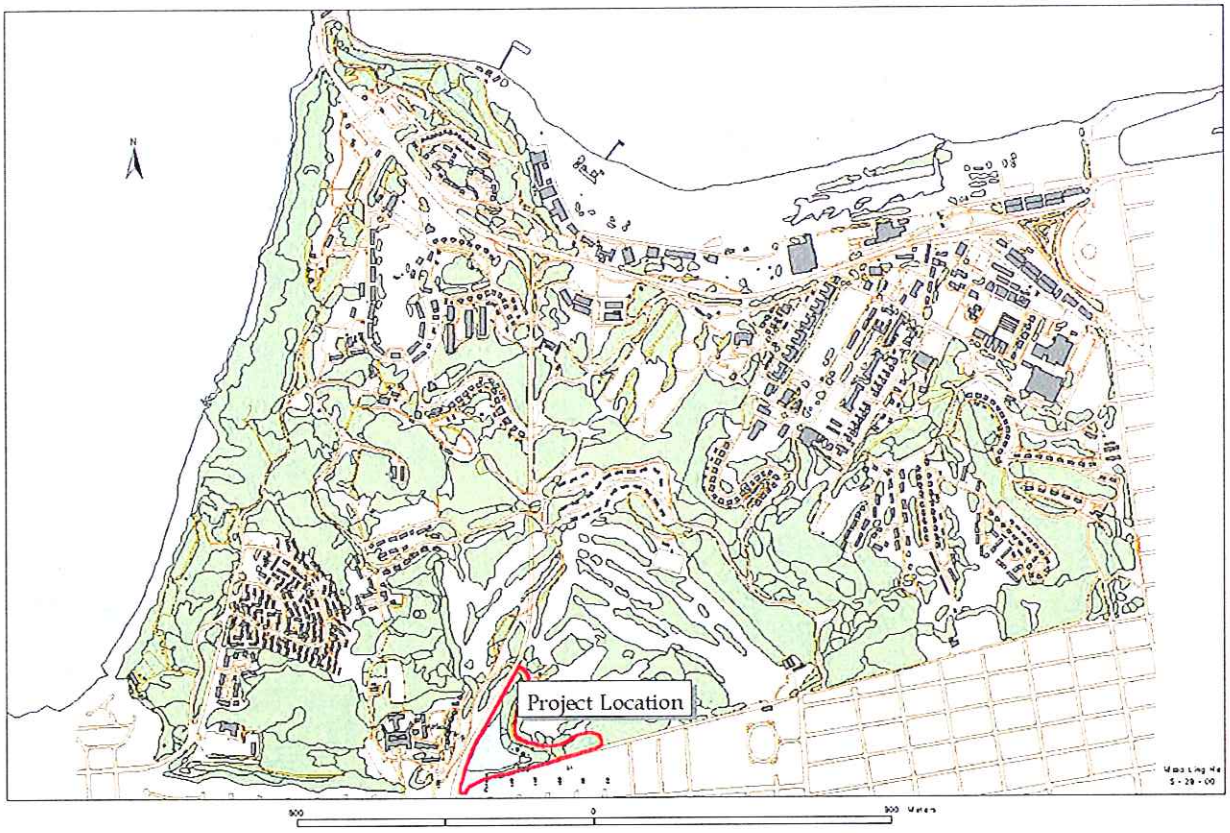


Figure 1: Site Vicinity Map of The Mountain Lake Area

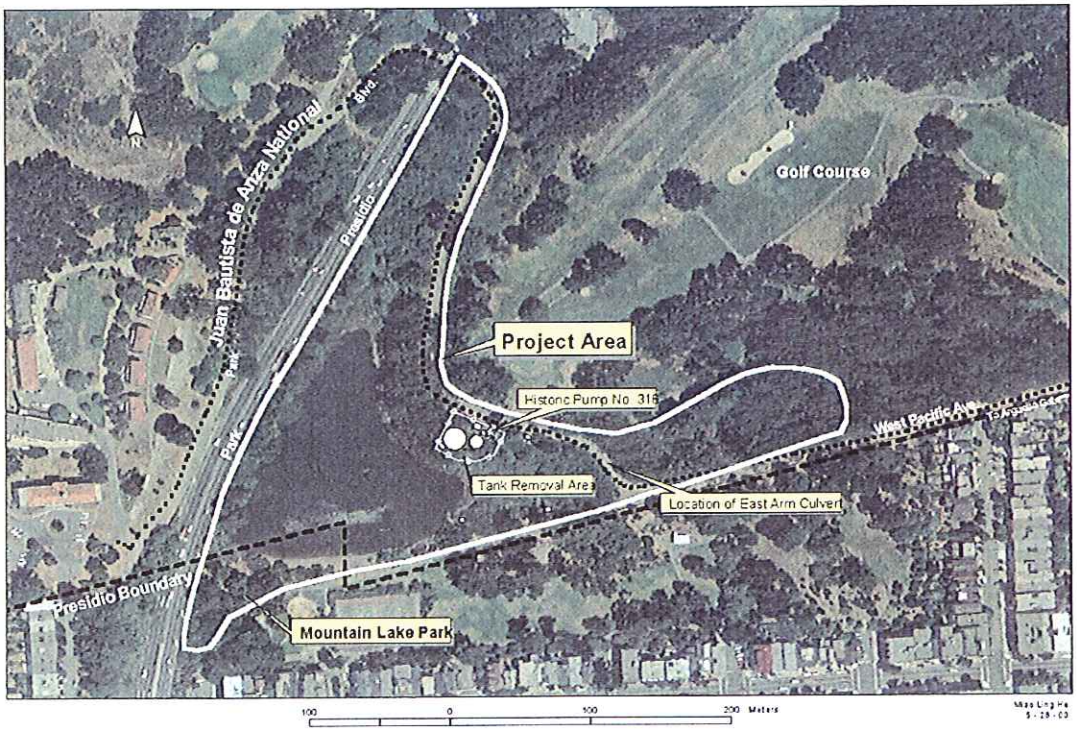


Figure 2: Project Area

1.1.3.1 Water Quality

The Mountain Lake project is needed to improve the deteriorating water quality of Mountain Lake. Because of numerous direct and indirect human impacts over time, today Mountain Lake is less than one-third of its original depth and 40% smaller in area, suffers from persistent algae blooms, periodic fish kills, eutrophication (when a high nutrient content results in low dissolved oxygen levels), and poor water quality. Leaves falling into the lake from adjacent eucalyptus trees increase nutrient inputs and darken the lake. As a result of human activity in and around the Project Area, Mountain Lake is now shallow enough for emergent vegetation to spread into the open water area of the lake.

1.1.3.2 Natural Resources

The Mountain Lake project is needed to improve and enhance the natural resources of the lake for its flora and fauna. The Project Area contains a mosaic of native and exotic plant and animal species. Within the lake, only exotic species of fish such as carp and spotted bass are found. Non-native bullfrogs and turtles predominate in the lake. Native species such as the red-legged frog and Western pond turtle are not found in the lake. Upland areas around the lake include remnant native wetland and riparian woodland (Figure 3). These habitats are relatively uncommon at the Presidio and in San Francisco. Native habitats at Mountain Lake have been severely impacted by the spread of invasive exotic trees and weeds. Exotic trees cover nearly half of the upland areas within the Project Area. Exotic weeds cover over 2/3 of the upland areas, and are rapidly spreading into remaining native habitats, decreasing their structural diversity and habitat value.

1.1.3.3 Cultural and Historic Resources

The Mountain Lake project is needed to protect and enhance the cultural and historic resources of the Presidio. Mountain Lake is a contributing feature to the Presidio of San Francisco National Historic Landmark District. In the 1993 National Historic Landmark Nomination update, the Project Area is predicted to have prehistoric archeological potential. Mountain Lake probably served as a freshwater resource for Native American tribes. It is believed to be the site of a 1776 Spanish encampment. Recent archaeological and historical reviews of the Project Area have revealed one historic pump, located to the east of the lake (Appendix A). This is currently located inside a fenced enclosure that is not open to the public. No other known cultural resources exist within the Project Area.

1.1.3.4 Recreation and Visitor Amenities

The Mountain Lake project is needed to protect the recreational resources and improve the visitor amenities of the Presidio. Mountain Lake is a popular visitor and recreational destination. The Project Area is currently used for a wide variety of recreational uses including jogging, walking, dog-walking, and bird-watching, as well as science and education programs. However, the existing recreational setting is degraded. Shorelines are impacted by unrestricted human access, lake views are

restricted from the Juan Bautista de Anza Trail, and non-native invasive vegetation limits wildlife habitat (Figures 3 and 4). The Project Area contains few visitor amenities (such as wayside exhibits, group gathering areas, and benches) to support existing recreation and visitor uses of the site.

1.1.4 Purpose and Project Objectives

The objectives of the Mountain Lake Enhancement Plan have been developed to support the need for the project, as summarized above in Section 1.1.3. They are consistent with the broad goals defined in the approved 1994 GMPA, which call for promotion of Mountain Lake's "natural and recreational values" for the enjoyment of present and future generations. The GMPA also specifies protection of Mountain Lake and surrounding terrestrial systems.

The broad objectives provided by the GMPA for Mountain Lake were further refined as a condition of project funding. The San Francisco International Airport (SFIA) provided funding for phase one of the Mountain Lake Enhancement Project as approved mitigation for wetland filling activities related to airport terminal construction. The Regional Water Quality Control Board (RWQCB) approved these more specific Mountain Lake Enhancement Project objectives, as outlined in the Cooperative Agreement for the Restoration of Mountain Lake (SFIA, 1998):

- Identification of the source(s) of sedimentation, and recommendations for the reduction in the sources of such sedimentation
- Identification of contaminants in sediment and recommendations for remediation
- Recommendations for habitat enhancement
- Recommendations for public access enhancement
- A mitigation monitoring program

The Presidio Trust, GGNPA, and NPS reviewed the broader programmatic objectives for Mountain Lake contained within the 1994 GMPA and the 1998 SFIA funding requirements and formulated the following objectives for the Mountain Lake Enhancement Plan:

1.1.4.1 Objective 1: Improve Water Quality

Addressing the factors that impact water quality, such as the shallowness of the lake, nutrient-rich sediments, and nutrient inputs from eucalyptus trees, has been identified as the most important project element in the Mountain Lake Enhancement Plan.

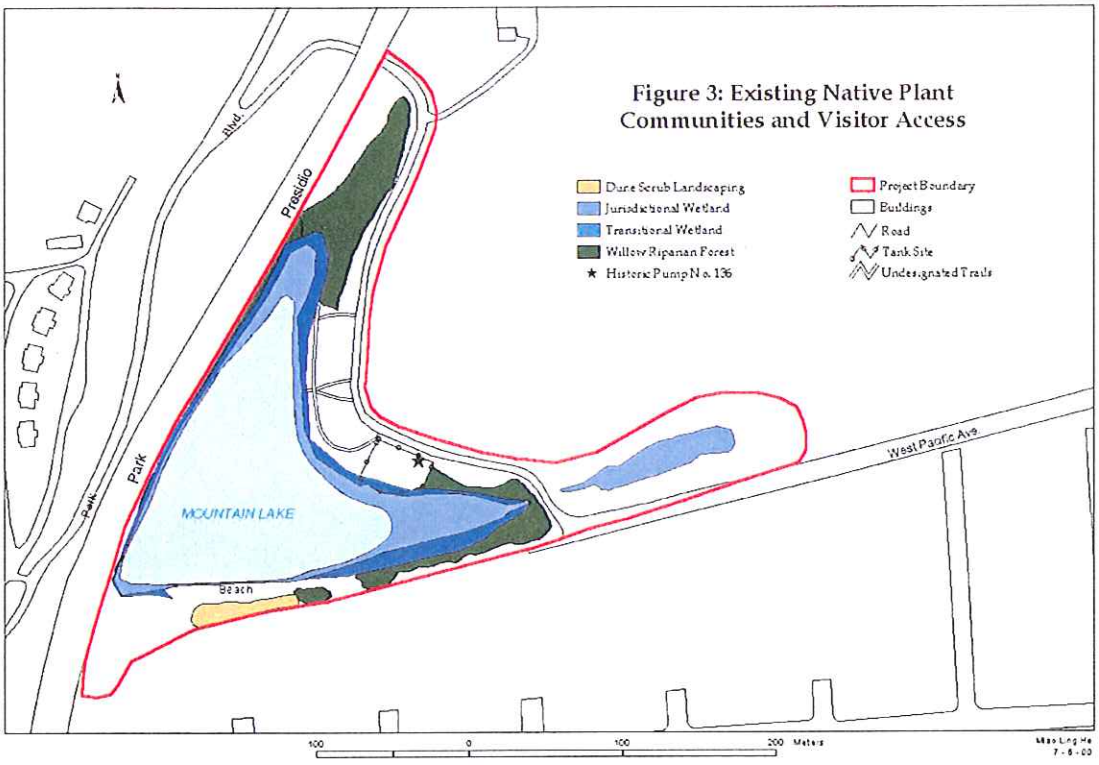


Figure 3: Existing Native Plant Communities and Visitor Access
Dune Scrub Landscaping
Jurisdictional Wetland
Transitional Wetland
Willow Riparian Forest
Historic Pump No. 136
Project Boundary
Buildings
Road
Tank Site
Undesignated Trails
Presidio
Park
MOUNTAIN LAKE
Beach
West Pacific Ave
100 0 100 200 Meters

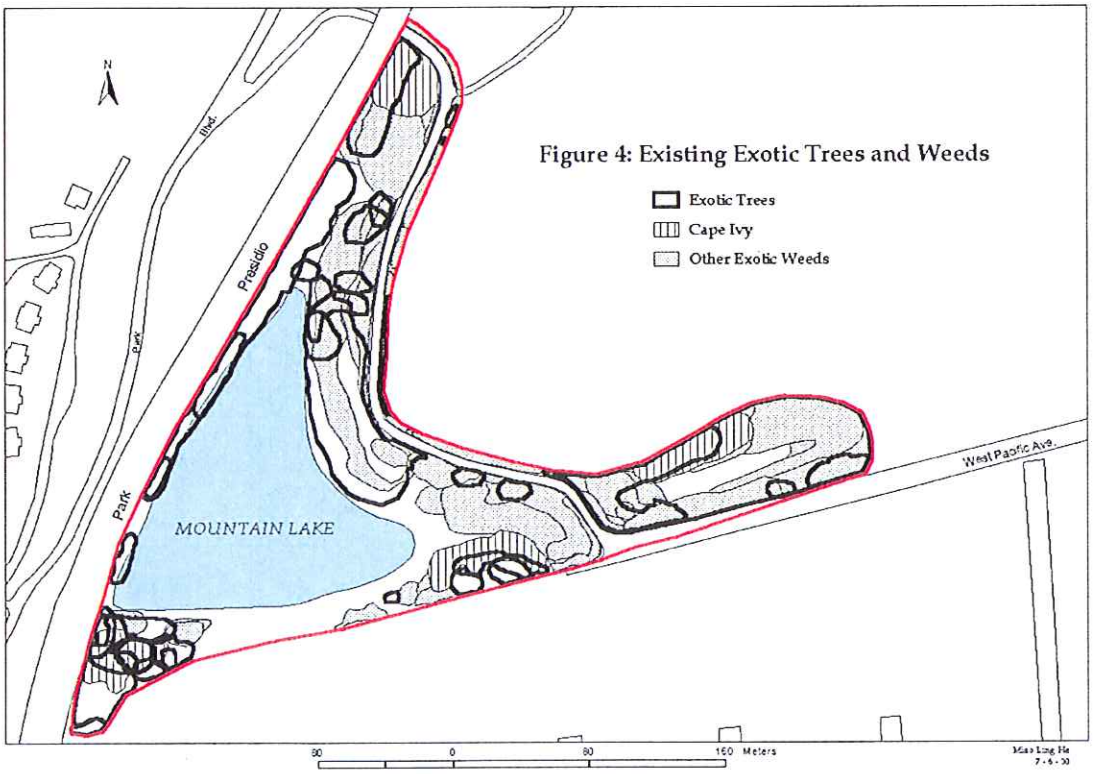


Figure 4: Existing Exotic Trees and Weeds
Exotic Trees
Cape Ivy
Other Exotic Weeds
Presidio
Park
MOUNTAIN LAKE
West Pacific Ave.
80 0 80 160 Meters

1.1.4.2 Objective 2: Enhance Habitat

The protection and enhancement of native wetland and upland plant communities at Mountain Lake would increase habitat value. Enhancements include increasing native plant diversity and the extent of native plant communities, as well as improving habitat quality by removing invasive exotic species and increasing structural diversity.

1.1.4.3 Objective 3: Enhance Public Access

Mountain Lake is a popular destination for a variety of visitors. Pedestrians, dog walkers, and cyclists use the area. Constructing visitor access improvements such as trails and benches would both improve the visitor experience and support Objectives 1 and 2 by eliminating un-designated trails and eroding slopes.

1.1.5 Issues to be Addressed During Planning and Implementation

During the public scoping period associated with this planning process, the Presidio Trust issued a request for early consultation with federal, state, and local authorities. Many agencies submitted initial comments in response to this request. Issues and concerns raised by the public during the planning process are contained in Section 5, Consultation and Coordination. The issues identified below will be resolved during the planning and implementation process.

1.1.5.1 California Environmental Quality Act (CEQA) and Mountain Lake Park

A portion of the Project Area includes Mountain Lake Park, a city park that is managed by the City of San Francisco Recreation and Parks Department. The Proposed Action does not include any actions within the city park's jurisdiction and therefore does not require any city approvals and/or CEQA review. All proposed enhancement measures contained within this document were designed to complement the natural resources and visitor uses of Mountain Lake Park. Though it is not believed that city approvals and CEQA are required at this point in the planning process, the city's Planning Department and Recreation and Parks Department would remain closely involved throughout the remainder of the planning and forthcoming implementation phases.

1.1.5.2 Permitting

Early consultation with regional and federal regulatory authorities revealed that proposed enhancement activities may require additional permits and/or certifications. The degree to which regional and federal permits are required would be determined following the adoption of a preferred project alternative.

1.1.5.3 Lake Bottom Sediment Quality

The Presidio Trust remediation program is currently pursuing a regulatory process to assess whether and ensure that Mountain Lake's bottom sediment is not contaminated. Initial consultant studies and

U.S. Army recommendations suggest that the sediment does not exceed clean-up thresholds and would not require remedial action. A formal decision regarding this issue will be incorporated into a final remedial action decision document, which is scheduled for release in early 2001. The outcome of this regulatory issue may affect the manner in which dredged lake bottom material is disposed of and/or used as part of the Mountain Lake Enhancement Plan.

1.1.5.4 Historic Preservation

The Presidio of San Francisco is a National Historic Landmark District with the period of historical significance extending from 1776 to 1945. Mountain Lake is a contributing feature to the Landmark District due to its physical prominence and its historical associations, and has prehistoric archeological potential (listed as P3 in the NHL). Mountain Lake was used historically as a water source. There is one historic object (PE-316) located within the Project Area, a water pump that is housed in a non-historic structure. During the construction phases of the Enhancement Project, professional archeological monitoring would occur to ensure that any unanticipated, post-review discoveries are treated appropriately. If any archeological or other historic resources are discovered during the construction process, the State Historic Preservation Office and the Advisory Council on Historic Preservation would be notified and the protocols outlined in 36 CFR Part 800.13 "Post Discoveries" would be followed.

2. Affected Environment

This section summarizes the Project Area's affected environment: land use, geomorphology and soils, water resources, biological resources, cultural resources, recreation and visitor use, transportation, air quality, noise, hazardous substances, and visual resources. Relevant information regarding the regulatory framework for the affected environment is provided as well. Project-specific permitting and regulatory compliance information is summarized in Section 3.5, Permits and Approvals Required to Implement the Proposal.

2.1 LAND USE

The affected environment discussed in this section includes the existing land uses both in the vicinity of Mountain Lake and within the Project Area.

2.1.1 Regional Context

The 1,480-acre Presidio is at the northern tip of the San Francisco peninsula, immediately south of the Golden Gate Bridge. The Presidio contains natural areas and pockets of military-related buildings and other developed areas. The Presidio is part of the Golden Gate National Recreation Area, a national park. Most of the 14.25-acre Project Area is within the Presidio (13.12 acres) and a small portion (1.13 acres) is within the City of San Francisco (Figure 2). The Presidio Trust has administrative jurisdiction over approximately 80 percent of the Presidio (known as "Area B"), including Mountain Lake. The National Park Service has jurisdiction primarily over the coastal areas (known as "Area A").

The Project Area includes Mountain Lake (4.02 acres) and surrounding wetland, riparian, and woodland, coastal scrub, and disturbed habitat (10.23 acres), (Figure 3). The Project Area is located in the southernmost portion of the Presidio (Figure 1) and has significant recreational, ecological, and historic value. The topography of the area in the vicinity of Mountain Lake is moderately sloping with a southwestern aspect. The Project Area is bounded by the Presidio golf course to the east, by Lake Street to the south, and by Park Presidio Boulevard to the west (Figure 2). City of San Francisco property and residential neighborhoods border the south side of Mountain Lake.

Pedestrian access points to Mountain Lake from city streets are 8th, 9th, 10th, 11th, 12th, and Funston Avenues. From within the Presidio, pedestrians can approach Mountain Lake from the west through the 15th Avenue entrance and from the east on West Pacific Avenue, which runs past the golf course to the Arguello Gate (Figure 2). Automobile access to the Public Health Service Hospital is through

the 15th Avenue entrance, which connects with Wedermeyer Street. Parking is available near the intersection of Wedermeyer and 15th at the Public Health Service Hospital. Automobiles are not allowed on Park Boulevard or West Pacific as they run through the Project Area. These paved roads provide safe pedestrian connections to the south shore of the lake and city-owned Mountain Lake Park.

2.1.2 Relevant Plans and Policies

The following land use policies were analyzed for consistency with the proposed concept plan:

- The Presidio Trust Act and General Objectives of the GMPA
- The GMPA
- The Presidio Trust Implementation Plan
- The Presidio Vegetation Management Plan (Draft)
- The San Francisco Master Plan

2.1.2.1 Presidio Trust Act and General Objectives of the GMPA

The Presidio Trust Act (Title I of Public Law 104-333), as amended, requires the Presidio Trust to manage the property under its administrative jurisdiction, including Mountain Lake, in accordance with the purposes set forth in Section 1 of the Act establishing the Golden Gate National Recreation Area and in accordance with the "general objectives" of the GMPA. The purposes of the GGNRA Act call for preserving the GGNRA in its natural setting and protecting it from development and uses that would destroy the scenic beauty and natural character of the area. The general objectives of the GMPA are not precisely identified either within the text of the GMPA itself (i.e., no list of "general objectives" appears in the document) or in the Trust Act. However, the Presidio Trust set forth the general objectives of the GMPA in Board Resolution No. 99-11, dated March 4, 1999 (General Objectives), which, in part requires the Trust to "preserve and (where appropriate) enhance the historical, cultural, natural, recreational, and scenic resources of the Presidio." Project actions and Proposed Actions in the Mountain Lake Enhancement Plan are consistent with this objective.

2.1.2.2 General Management Plan Amendment, Presidio of San Francisco

The general direction for land use at Mountain Lake was derived from the 1994 GMPA which outlined the importance of Mountain Lake as a historic interpretation site as well a site where natural resource management efforts need to be focused. According to the GMPA, the natural aquatic system and wildlife habitat in and around Mountain Lake would be protected and enhanced for ecological and recreational values. Project objectives and Proposed Actions in the Mountain Lake Enhancement Plan are consistent with the GMPA.

2.1.2.3 Presidio Trust Implementation Plan (PTIP)

The Presidio Trust is currently updating the 1994 GMPA in a process known as the Presidio Trust Implementation Plan (PTIP). The PTIP will provide a comprehensive planning framework within which projects proposed in Area B of the Presidio would proceed. A proposed planning principle within PTIP calls for identifying, protecting, and enhancing remnant natural habitats especially for rare and endangered species (Presidio Trust, 2000d). Project objectives and Proposed Actions in the Mountain Lake Enhancement Plan are consistent with the proposed PTIP habitat enhancement objective.

2.1.2.4 The Presidio Vegetation Management Plan (VMP)

The Draft Vegetation Management Plan (VMP) identifies Mountain Lake as a native plant community zone. The Mountain Lake Enhancement Plan proposes to enhance existing native plant communities and to increase the footprint of those communities through restoration. It also provides for the retention of some existing non-invasive exotic vegetation in areas not directly threatening native habitat. The Proposed Action and the Alternatives in the Mountain Lake Enhancement Plan are consistent with this designation.

2.1.2.5 San Francisco Master Plan

The Project Area is located on the southern border of the Presidio and a portion of the area is under the jurisdiction of the city of San Francisco. The Presidio is under federal jurisdiction and is not subject to state and local land use plans and policies. Nevertheless, the City and County of San Francisco included a policy concerning the Presidio in the recreation and open space element of the San Francisco Master Plan (1988). Policy 5 reads "preserve the open space and natural, historic, scenic and recreational features of the Presidio" (City and County of San Francisco, 1988). It should be noted that none of the actions proposed by in the Mountain Lake Enhancement Plan take place within the portion of the site administered by the City and County of San Francisco. Ongoing consultation would continue between the Presidio Trust and the City of San Francisco during the planning, design, and implementation phases of the Mountain Lake Enhancement Plan.

2.2 GEOMORPHOLOGY AND SOILS

The affected environment discussed in this section includes the soil and underlying substrate within the Project Area.

2.2.1 HISTORIC AND EXISTING GEOMORPHOLOGY

The San Francisco peninsula is underlain with sandstone, shale, graywacke, greenstone, gneiss, and serpentinite of the Mesozoic-era Franciscan assemblage. In the Presidio, these old rocks are covered by younger deposits of the Colma Formation, and more broadly by sand dune deposits of the late Pleistocene and Holocene, which form one of the most extensive coastal sand dune deposits in

California (Reidy, 1999). Mountain Lake is located behind the foredunes of this coastal sand complex, with the sandy Colma Formation near the surface. The lake was likely created from wind erosion of the dunes down to the water table, creating a dune hollow. Recent carbon dating studies indicate that the lake is probably 1700 years old (Reidy, 1999). The elevation of Mountain Lake is approximately 130 feet above Mean Sea Level.

Since about 1750, the natural filling of the lake by sedimentation has been accelerated by human activities. Farming, urban and golf course development contributed to an increase in sedimentation and buildup of organic debris. In the late 1930s, a large amount of fill was introduced into the lake during the construction of Park Presidio Boulevard, which reduced the size of the lake by about 40% (Horne, 2000). Near shore sediment removal has created steep banks in some areas around the lake's periphery. Current lake bathymetry (Figure 5) is significantly altered from its pre-European form.

2.2.2 Soil and Substrate

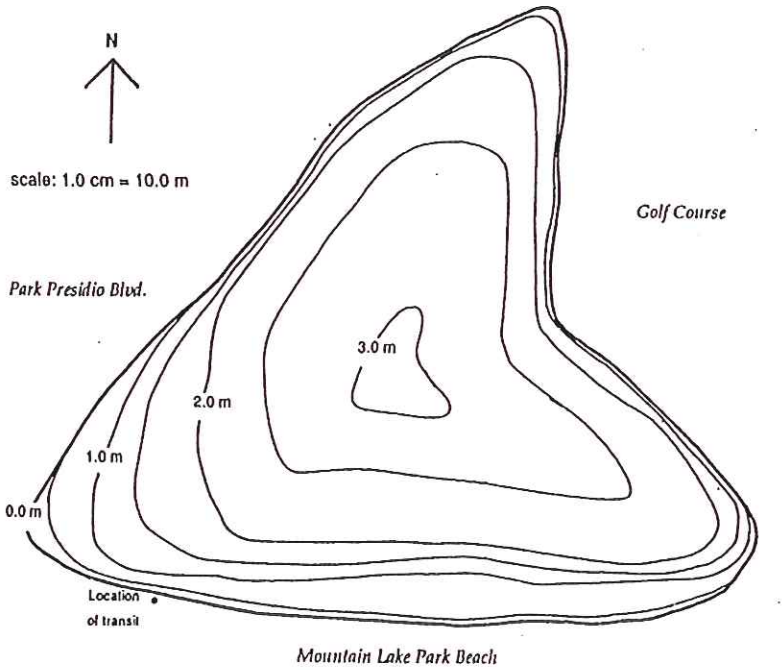
The soil and underlying substrate of the Project Area presently consists of a mixture of natural dune sand, beach sand, and silt. The lake subsurface material is composed primarily of silt and clay to a depth of approximately 6-10 feet. Below this level the subsurface is composed of a mixture of sands, silt, and clay (Erler and Kalinowski, 1998).

2.3 WATER RESOURCES

The affected environment discussed in this section is comprised of 4.2 acres of year-round open water in Mountain Lake, and 1.7 acres of jurisdictional wetlands surrounding the lake and to the east of the east arm culvert (Figure 3).

Mountain Lake is one of the few remaining natural lakes in San Francisco and is the only lake within the Presidio, making it a unique natural resource (Codemo et al., 1994; Horne, 2000). The watershed area of Mountain Lake is approximately 200 acres, and the drainage basin includes part of the Presidio Golf Course and the residential area south of the lake (Horne, 2000; Dames and Moore, 1997). A part of the housing facility located adjacent to Washington Boulevard in the Presidio also lies within the watershed (Figure 1). Highway 1 enters a tunnel in an area close to the center of the watershed (Dames and Moore, 1997).

Mountain Lake is substantially decreased in size compared to its historic footprint. Approximately 40 percent of Mountain Lake was filled during road construction in 1939, and sedimentation rates continue to be high (Horne, 2000). Sedimentation from highway construction and other sources have decreased the maximum lake depth from approximately 30 feet to 9 feet (Figure 5).



Note: Contour lines indicate depths in 0.5 m increments. All depth measurements were taken relative to the water level of the lake on 9/17/94.

Figure 5: Existing Bathymetry of Mountain Lake

High nutrients (e.g., nitrates and phosphates) and elevated temperatures in the lake increase the abundance of algae, creating "algae blooms" (Codemo, 1996; Horne, 2000; Beutel, 1997). Algae blooms have been associated with mortality of exotic fish in the lake such as carp (*Cyprinus carpio*), channel catfish (*Ictalurus punctatus*), and bass (*Micropterus* spp.; Navarett, 1994). Other urban nonpoint sources of nutrients from runoff and eucalyptus trees have compromised water quality (Horne, 2000).

2.3.1 HYDROLOGY

Mountain Lake is a groundwater-fed lake, filled and drained by subsurface flow through the sandy substrate (Nolte and Associates, 1993). In addition, some runoff from the golf course and the area around Park Presidio enters the lake through wetland areas in the east and north arms of the lake, particularly during large storm events (Dames and Moore, 1994; Horne, 2000). Local groundwater recharge has probably decreased since the planting of eucalyptus and Monterey Pines in the area surrounding the lake; these inhibit rainfall from reaching the ground and infiltrating (Poore and Fries, 1985).

A few historic descriptions imply that surface water may have flowed out of the southwest corner of Mountain Lake at some times in the past (Urban Watershed, 1999). The current uppermost stream flow in Lobos Creek is a few hundred feet west of Park Presidio Boulevard (Urban Watershed, 1999). The lake level may reflect the groundwater table in the area, which is fairly consistent throughout the year. There may be a low-permeability layer (e.g., peat) beneath the lake, which acts as a perching layer, helping to maintain the lake's level. All discharge from the lake appears to be subsurface groundwater flow (Dames and Moore, 1994). It is suspected that this groundwater flows west and feeds Lobos Creek, which supplies water to the Presidio and discharges into the Pacific Ocean at the south end of Baker Beach.

2.3.2 WATER QUALITY

2.3.2.1 Regulatory Framework for Water Quality

The Regional Water Quality Control Board (RWQCB) and the United States Environmental Protection Agency (U.S. EPA) sets water quality standards that are ecologically protective to aquatic systems (RWQCB, 1995; U.S. EPA, 2000). The RWQCB's, "Water Quality Control Plan, San Francisco Bay Basin" (RWQCB, 1995), specifies limits for the chemicals of concern for inland waters within the San Francisco Bay region, such as Mountain Lake. Construction activity involving dredging and sediment reuse within jurisdictional wetlands or waste discharge into wetlands and surface waters may be subject to Section 404 permits issued by the U.S. Army Corps of Engineers (USCOE). The USCOE requires evaluations of water quality considerations associated with waters of the United States. A Section 404 certification waiver from the RWQCB would be required for the Section 404 permit to be obtained.

2.3.2.2 Mountain Lake Water Quality

The following factors affect the water quality in Mountain Lake:

- Nutrient input from subsurface flows and runoff, which encourages algae blooms
- Oxygen depletion caused by seasonal algae bloom decomposition
- Poor water clarity
- Sedimentation
- Sediment quality
- Potential chemical contaminant runoff

Nutrient Input. Mountain Lake is eutrophic; it has high nutrient levels that can result in low dissolved oxygen levels. Nutrients enter the lake with sediments, stormwater runoff, and groundwater inflow. External sources of nutrients include plant matter, animal feces, and applied fertilizers. Leaves and other plant matter dropping from the large grove of eucalyptus trees along the east shore add nutrients to the lake's water (Horne, 2000). External nutrients enter the lake from urban sources within the drainage basin such as the golf course, Mountain Lake Park, and neighboring residential areas. Relatively high lake water temperatures (18 to 21 degrees Celsius) increase the rate of algae reproduction. Vertical mixing of warmer waters throughout the lake could also contribute to a high density of algae blooms (Codemo, 1996). Summer assemblages composed of cyanobacteria and algae blooms (480,000 cells/milliliter) dominated by the species *Aphanizomenon flosaquae* have been recorded (Codemo, 1996). Subsequent to blooms, algae die-offs occur during the late summer or early fall and deplete the lake's oxygen during decomposition (Codemo, 1996; Beutel, 1997).

Internal loading also causes high nutrient levels. Internal loading occurs when phosphate and ammonia stored in sediment on the lake bottom are released to the overlying waters. Because Mountain Lake is a shallow system (maximum depth approximately ten feet), these nutrients are rapidly circulated to the surface, where they contribute to the rapid growth of algae.

Peaks in these chemicals corresponded to declines in oxygen levels and are immediately followed by a sharp decline in phytoplankton numbers. The fish mortality that has been observed at Mountain Lake has been attributed to this phenomenon (Navarett, 1994).

Oxygen Depletion. When water in lakes has a high level of nutrients and is warm, algae grow rapidly, converting carbon dioxide into oxygen in the water. When the algae die, their decomposition depletes the water of oxygen and releases toxins. When oxygen levels drop due to the decomposition of algae blooms during the summer at Mountain Lake, increases in ammonia, sulfate, and orthophosphate have been observed in lake water (Codemo, 1996). Fish kills have been attributed to the combined effect of the oxygen depletion and toxins resulting from algae decomposition (Codemo, 1996; Horne, 2000).

Water Clarity. The poor water clarity in Mountain Lake is partly indicative of a eutrophic lake, where the great quantity of suspended algae in the lake reduces its clarity. Humic acids from decaying plants also reduce the clarity of the lake water. The eucalyptus that border much of the lake produce more humic acid than indigenous vegetation (Horne, 2000), creating poor water clarity in the lake.

Sedimentation. Mountain Lake has experienced a high rate of sedimentation for the past century. Sedimentation rates have increased from an estimated "normal" sedimentation rate of 0.1 mm/year to 19 mm/year in the last century. This is two orders of magnitude above normal rates (Horne, 2000) and result from human activity at Mountain Lake. A 1902 record indicates that the southwest-facing slopes between the golf links and the hospital above Mountain Lake were eroding, washing sediment into the lake. The construction of Park Presidio Boulevard in 1939 significantly reduced the size of Mountain Lake, when material excavated to construct the Funston Avenue approach to the Golden Gate Bridge was used to fill approximately 40 percent of the lake to provide a base for Park Presidio Boulevard.

Sedimentation from sources such as the golf course and neighboring residential areas continues to affect water clarity. Previous tests on composite samples revealed that the sediment six feet below the lake bottom is composed primarily of silt (66.1%) and clay (31.5%). The percent of sands increases at a depth of approximately ten feet (39.1% sands; 40.8% silt and 20.1% clay). At approximately fourteen feet, the sediment is composed of a mixture of sands (57%), silt (26.8%) and clay (16.2%) (Erler and Kalinowski, 1998). The percent sands increases with depth in all samples collected. It is possible that at depths of 25-30 feet, Mountain Lake might have supported both a photic (light penetration) zone and an aphotic (cooler, deeper, darker zone), thereby creating a temperature gradient as a function of lake depth. The current lack of a cooler, aphotic (lightless) zone at the lake bottom has exacerbated the effects of nutrient enrichment and temperature increases. With no deeper zone, warm water mixes throughout the lake during the summer. In addition, filling has reduced habitat for smaller fish and zooplankton (e.g., *Daphnia* spp.) in the lake (Horne, 2000).

Sediment Quality. For the purpose of evaluating the dredged sediment disposal options, composite core samples were taken from the lake bottom to depths of 10-20 feet for chemical analysis. The results indicated that the material is not expected to require special off-site disposal (Erler and Kalinowski, 1998). Based on previous analytical tests, sediment concentrations are likely to be lower than the soluble threshold limits concentrations required for on-site use (Erler and Kalinowski, 1998).

Most metals were detected at concentrations lower than the recommended ecological cleanup criteria for terrestrial soils at the Presidio (e.g., 477 mg/kg for lead). However, lead concentrations detected in some samples exceeded RWQCB wetland cover criteria (e.g.; 50 mg/kg; RWQCB, 1992), or could leach in excess of standards recommended for aquatic environments (e.g., 2.0 ppb for lead; EPA, 2000).

Possible Contaminants in Runoff. Runoff from the area surrounding Mountain Lake, including roadways and the golf course, can enter the lake either directly or through infiltration into the groundwater that feeds the lake. One sample exceeded the surface water quality objective: 2.8 µg/l of mercury was found in an October 1996 sample, compared with the objective of 0.012 µg/l; EPA 2000. (Codemo, et al., 1994; Beutel, 1997). Higher levels of mercury found in golf course runoff may indicate the golf course as a source of the mercury. At this time, the golf course is working on a management plan that addresses fertilizer, herbicide, and pesticide issues. As part of their plan, monitoring would be conducted by the golf course to assess the movement, if any, of herbicides and pesticides applied to the golf course. If during the course of monitoring, information is obtained that suggests that a chemical is leaving the root zone or is dissolved in surface water, appropriate corrective actions would be taken.

Eucalyptus leaf leachate is responsible for a darkening effect on the lake water (Horne, 2000) and may also compromise water quality (Laws, pers. comm.). Turpenoids from eucalyptus leaves are relatively insoluble and adsorb onto soil particles, but phenolics are water-soluble (Moral and Muller, 1969) and can enter water in the lake.

2.4 BIOLOGICAL RESOURCES

The affected environment discussed in this section includes the native and introduced plants and animals that are known to occur within the Project Area.

2.4.1 HISTORY OF VEGETATION AT MOUNTAIN LAKE

During the past 200 years the Presidio's vegetation has dramatically changed, a reflection of the different land management practices employed during the Spanish, military and modern periods. Despite these influences, there remain many small vestiges of surviving native plant communities with remarkably rich plant diversity. Mountain Lake was once very rich florisitically; now it is relatively depauperate except for the riparian forest bordering the eastern section of the lake. This Central Coast Arroyo Willow Forest is the richest existing indigenous wetland community on the Presidio (Vasey, 1993). As described in the *Flora of San Francisco*, San Francisco's formerly rich freshwater wetlands have largely disappeared, making the rich natural diversity of wetland features on the Presidio of significant regional value.

Paleoecological studies (Reidy, 1999) indicate that the likely assemblage of historic vegetation surrounding Mountain Lake included willows *(Salix* spp.), wax myrtle *(Myrica californica),* red alder *(Alnus rubra),* tules (*Scirpus* spp.), rushes *(Juncus* spp.), and cattails *(Typha latifolia)*. Wax myrtles are likely to have dominated the riparian woodland surrounding the lake (Reidy, 1999). The presence of coast live oaks *(Quercus agrifolia)* was recorded in the 1792 journal of Vancouver (Codemo, et al., 1994) and has been confirmed using palynology (Reidy, 1999). Remnant patches of this prehistoric native vegetation still exist around the lake (Figure 3).

Several other native trees and large shrubs have been recorded within the Project Area but are no longer found there. Examples of these flora include Pacific madrone *(Arbutus menziesii)*, toyon *(Heteromeles arbutifolia)*, holly-leafed cherry *(Prunus ilicifolia)*, California bay laurel *(Umbellularia californica)*, and California buckeye *(Aesculus californica)* (Jones and Stokes, 1997).

The establishment of weedy exotic species in the Presidio's natural landscape began as early as the Spanish period, when herds of goats, cattle, horses and sheep grazed freely, reducing many of the native vegetation communities to barren landscapes. With grazing came the introduction of exotic grasses for forage. These activities coupled with native tree and shrub removal for timber and fuel, provided opportunities for invasive exotic species to become established. Continued settlement during the American period facilitated the introduction of new Mediterranean, South African and South American species, many of which (including Cape ivy) now dominate portions of the Presidio, including Mountain Lake.

The historic plantations of exotic trees were introduced into the Presidio beginning in 1883 in part as an erosion control measure (Jones and Stokes, 1997). This effort was part of a "Plan for the Cultivation of Trees" under Major W. A. Jones (NPS, 1998). The planting effort continued until the early 1900s (NPS, 1998). The dense, mixed-age stands of eucalyptus that border Mountain Lake to the east and north are likely offspring of the original planting efforts (Jones and Stokes, 1997). Most of the trees in the eucalyptus grove along Mountain Lake's east shore are the offspring of 5 or 6 planted trees. Eucalyptus is the dominant exotic tree species within the Project Area, with smaller stands of Monterey cypress present in upland habitats around the lake (Figure 4).

2.4.2 Existing Biological Resources

2.4.2.1 Plant Communities

Mountain Lake is surrounded by approximately 10.23 acres of terrestrial habitat within the Project Area (Figure 2). Native plant communities found at Mountain Lake include Coastal Freshwater Marsh and Central Coast Arroyo Willow Riparian Forest (Holland, 1986). The lake's terrestrial habitat can be broadly categorized as wetland and riparian in the lowland areas; woodland and coastal scrub, and disturbed habitat in the upland areas. In addition to native vegetation, a large number of invasive exotic species are present (Figure 4).

Coastal Freshwater Marsh. Wetlands are protected under the Clean Water Act. The USCOE regulates discharge of dredge or fill materials in waters of the US, including wetlands under the Clean Water Act. USCOE permits and/or certifications may be necessary as part of the implementation of the Proposed Action.

Historic and current data indicate that wetlands provide locally important habitat for aquatic organisms and terrestrial wildlife. A wetland delineation and a wetland vegetation mapping project were conducted in the Project Area to determine the extent of USCOE jurisdictional wetlands and to

classify wetland vegetation types and extent in accordance with the USCOE and U.S. Fish and Wildlife procedures (Castellini, 2000; Buisson, 1999). The USCOE defines jurisdictional wetlands as areas that are inundated or saturated by surface or groundwater and can support vegetation typically adapted for those conditions. The three criteria used to delineate wetlands in accordance with the USCOE classification system are the presence of (1) hydrophytic vegetation, (2) wetland hydrology, and (3) hydric soils (USCOE, 1987). The USFWS defines wetlands as those areas that have one or more of the following attributes (1) periodic occurrence of wetland vegetation, (2) hydric soils, or (3) saturated with water for part of the year (Cowardin, 1979). In accordance with this system, there are approximately 1.70 acres of jurisdictional wetlands and 0.8 acres of transitional wetlands surrounding the jurisdictional wetlands (Wood, 1999; Figure 3).

Typical native plant species in the wetlands surrounding the lake include tules, sedges, rushes, and willows. Mountain Lake wetlands support waterfowl as well as many passerine and shore birds (Appendix B). The most dense belts of wetland marsh vegetation are present on the north and east arms of the lake (Buisson, 1999). In the remaining areas, the marsh has been significantly degraded by factors like human use (direct access to the lake) and the presence of exotic vegetation (Figure 4).

Central Coast Arroyo Willow Riparian Forest. There are 2.1-acres of existing willow riparian forest at Mountain Lake (Figure 3). This forest contains native plants such as arroyo willow (*Salix lasiolepis*), California blackberry (*Rubus ursinus*), California tule (*Scirpus californicus*), rushes (*Eleocharus* spp.), lady fern (*Athyrium filix-femina*), and American dogwood (*Cornus sericea).*

The highest density of arroyo willow is found on the north and east arms of the lake. There are a few remnant individuals in the seasonal wetland east of the culvert. Remnant individuals of species such as red elderberry *(Sambucus racemosa),* wax myrtle (*Myrica californica*) and red alder (*Alnus rubra*) are present along the north and east riparian areas of Mountain Lake. One blue elderberry *(Sambucus mexicana)* exists in the seasonal wetland east of the east arm culvert (Clark, pers. comm.).

Dune Scrub. In 1992, City of San Francisco Park and Recreation Department staff and volunteers introduced native dune scrub vegetation along the south shore, as a part of a native landscaping effort. Plant species include yarrow *(Achillea millefolium),* yellow-bush lupine *(Lupinus arboreus),* coyote bush (*Baccharis pilularis*), and coast buckwheat *(Eriogonum latifolium.* Other native species added to this landscaping effort in June 2000 include Douglas iris *(Iris douglasiana),* sticky monkey flower *(Mimulus aurantiacus),* coffee berry *(Rhamnus californica),* pink-flowering currant *(Ribes sanguineum var. glutinosum)* and coast blue blossom *(Ceanothus thyrsiflorus).*

Exotic Species Stands. The plant communities within the Presidio have been significantly altered by the spread of invasive exotic plants. These alterations have affected ecosystem function, significantly reduced vascular plant species richness, reduced insect abundance in certain plant communities, and reduced habitat for indigenous wildlife. The rapid spread of invasive exotic plant species is one of the

most critical threats to the viability of the Presidio's native flora. Of the 389 plant species inventoried within the Presidio's natural areas, 161 are exotic (Vasey, 1993)

Numerous invasive exotic species have been documented around Mountain lake (Figure 4). These plants include eucalyptus, Monterey cypress, Cape ivy, English ivy *(Hedera helix),* Algerian ivy *(Hedera canariensis),* Himalayan blackberry *(Rubus discolor),* and periwinkle (*Vinca major*). Eucalyptus currently dominates upland areas within the Project Area (4.3 acres). Most of the eucalyptus within the Project Area is blue gum (*Eucalyptus globulus)*, with the exception of the red river gum *(E. camaldulensis)* along Park Presidio Boulevard. There are also smaller stands of Monterey cypress and Monterey pine (Figure 4). The next most dominant exotic species are English ivy (3.9 acres in both riparian and woodland habitat), and Himalayan blackberry (2.3 acres primarily in riparian habitat). Cape ivy (0.7 acres) is a dense, highly persistent weed that climbs other woody vegetation. Eradication of this weed is a high priority within the GGNRA (NPS, 2000).

2.4.2.2 Wildlife

Both the lake and its surrounding wetland areas are a valuable natural resource for wildlife. Native species in the Project Area include waterfowl and other birds that nest, roost, and/or feed within the site (Appendix B). An early documentation of Mountain Lake described it as a "protected sanctuary for waterfowl." The lake provides both shallow "dabbling" habitat for waterfowl, such as ruddy ducks (*Oxyura jamaicansis*), ring-necked ducks *(Aythya collaris),* and California gulls *(Larus californicus),* as well as deeper diving habitat for birds such as grebes, which are known to occur at Mountain Lake (Murphy, 1999).

Mountain Lake is also home to a number of other bird species. Year-round residents include the Anna's hummingbird *(Calypte anna),* the red-tailed hawk *(Buteo jamaicencis),* and the red-shouldered hawk (*Buteo lineatus*). Dense stands of willow and other riparian plants provide a refuge for a diversity of birds in the north and east arms of Mountain Lake. Commonly seen birds in this habitat include the Swainson's thrush *(Catharus ustulatus),* cedar waxwing (*Bombycilla cedrorum*), pygmy nuthatch (*Sitta pygmaea*), ruby-crowned kinglet (*Regulus calendula*), dark-eyed junco *(Junco hyemalis),* and black phoebe *(Sayornis nigricans;* Clark, pers. comm.; Murphy, 1999).

Native red-legged frogs *(Rana aurora draytoni)* and Western pond turtles *(Clemmys marmorata pallida)* may have once been present at Mountain Lake, but they have not been sighted in recent surveys. Instead, mostly exotic species of amphibian, reptile, and fish have been identified at Mountain Lake. The bullfrog *(Rana catesbeiana)* is an exotic amphibian frequently seen at the lake. Red-eared sliders *(Trachemys scripta elegans)* and the eastern soft-shell turtle *(Apalome* spp.*)* have also been seen. Only one native Pacific tree frog (*Hyla regilla*) has been recorded up the east arm, beyond the culvert (Laws, pers. comm.). No native fish lived in Mountain Lake (Horne, 2000). However, today several species of exotic fish are found in Mountain Lake. Fish present in Mountain

Lake include carp, channel catfish, bass, hitch (*Lavinia exilicauda*), and fathead minnows (*Pimephales promelas*). Exotic crayfish *(Pacifasticus leniusculus)* have also been recorded at Mountain Lake. This preponderance of larger fish probably lower the number of smaller planktivorous fish and zooplankton, thereby contributing to algae blooms that have been recorded in the lake (Horne, 2000).

2.4.2.3 Special Status Species

Regulatory Framework for Special Status Species. The Endangered Species Act and the Migratory Bird Treaty Act protect special status species within the Project Area. Since Mountain Lake is predominately federal land, all actions within the Project Area must comply with the Endangered Species Act of 1973 and the Migratory Bird Act. Project actions would not jeopardize the continued existence of any endangered or threatened species, and would not result in the destruction or adverse modification of endangered species habitat. Under the Migratory Bird Treaty Act, migratory birds are federally protected.

Special Status Species. Special status species present within the Project Area (Appendix C) include the state endangered willow flycatcher, a summer and fall migrant that uses Mountain Lake on a seasonal basis (Clark, pers. comm.). Dense willow habitat within the north and east arms of Mountain Lake provide summer roosting areas for the willow flycatcher, which has been sighted several times in the area (Clark, pers. comm.).

Species of special concern that are known to occur within the Project Area include the yellow warbler *(Dendroica petechia),* the olive-sided flycatcher *(Nuttallornis borealis)*, the sharp-shinned hawk *(Accipiter striatus velox),* Coopers hawk *(Accipiter cooperi),* and merlin *(Falco columbarius columbarius)*. The olive-sided flycatcher breeds within the Project Area. The yellow warbler, the sharp-shinned hawk, and the Coopers hawk could breed in the area (Clark, pers. comm.). Other special status species that may occur but have not been documented at Mountain Lake are the Yuma myotis bat (*Myotis yumanensis*; Jones and Stokes, 1997) and the San Francisco forktail damselfly *(Ischnura gemina;* Castellini, pers. comm.). Appendix C provides a more detailed enumeration of special status species at Mountain Lake. In addition, migratory bird species use the lake during their fall and spring migration along the Pacific flyway.

2.5 CULTURAL AND HISTORIC RESOURCES

The affected environment discussed in this section includes both known and potential cultural and historic resources within the Project Area.

2.5.1 REGULATORY CONTEXT

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to take into account the effect of dredging and other enhancement actions at Mountain Lake, and to protect

existing cultural resources. The State Office of Historic Preservation and the Advisory Council on Historic Preservation (ACHP) would be provided with reasonable opportunity to comment on project related construction activities. Section 106 compliance for this project would be provided through the Presidio Programmatic Agreement.

Cultural resources discussed in this section include Mountain Lake in the context of the Presidio National Historic Landmark, the Juan Bautista de Anza Historic Trail, and the historic pump located within the tank area (Appendix A).

2.5.2 History

Native people today referred to as Ohlone/Costanoans were the earliest human inhabitants of the area now called the Presidio. The Ohlone/Costanoans were hunter-gatherers who lived in extended family units and depended on the abundant plant and animal resources of the area for subsistence (Margolin, 1978; Jones and Stokes 1996). As one of the few persistent freshwater lakes in the region, Mountain Lake was probably used by Ohlone/Costanoans Indians during prehistoric times (NPS, 1994; Reidy, 1999).

The earliest written record of Mountain Lake is in the diary of Father Pedro Font, who was part of the Spanish Colonial de Anza expedition, which set up an encampment in the Mountain Lake area on March 27, 1776. Father Pedro Font recorded the "fine lake or spring of very good water near the mouth of the port of San Francisco" (Codemo, et al., 1994). He mentioned the area immediately around Mountain Lake had good pasturage, plenty of firewood, and water (Reidy, 1999). He also noted the presence of certain plants such as manzanita and wild violets. The 1792 journal of George Vancouver documents the extensive pastoral use of San Francisco and an abundance of coast live oaks in the area (Reidy, 1999).

The Presidio was established as a military post in 1776 during Spain's colonial expansion (Haller, 1994). The Mexican government occupied the Presidio from 1821 to 1846. After California became part of the United States as a result of the Mexican-American war, the Presidio was established as a U.S. post. Beginning in 1883, upland areas within the watershed of Mountain Lake were planted with Monterey pine (*Pinus radiata*), Monterey cypress (*Cupressus macrocarpa*) and blue gum (*Eucalyptus globulus*) as part of the Jones plan for the forestation of the Presidio. In 1897, the Army began to use Mountain Lake water for domestic purposes. Construction of the Presidio golf course in the 1890s and subsequent pumping of water from Mountain Lake for irrigation of the golf course affected the hydrology of the lake and surrounding area. The construction of Mountain Lake Park by the city of San Francisco along Mountain Lake's south shore increased visitor activity in the vicinity of the lake. In 1939, nearly 40 percent of the lake was filled with soil excavated during the construction of the Pershing Tunnel to create a roadway for Park Presidio Boulevard. In 1994, the Presidio, including Mountain Lake, was transferred from the U. S. Army to the Golden Gate National Recreation Area.

2.5.3 Status of the National Historic Landmark

The Presidio of San Francisco was designated a National Historic Landmark in 1962, and this designation was updated in 1994. Mountain Lake is a contributing feature of the Landmark District and the site is predicted to have prehistoric archeological potential. The Landmark also includes the Juan Bautista de Anza Trail.

2.5.4 Cultural Resources Present in the Project Area

The Juan Bautista de Anza Trail runs through the Project Area along West Pacific Avenue. Archeological and historical reviews of the Project Area revealed one historic pump (#316), which contributes to the Landmark District and is located east of the lake. A letter was prepared to the State Historic Preservation Officer and the Advisory Council on Historic Preservation subsequent to the identification of the pump. The historic pump is currently located inside a non-historic structure in a fenced enclosure east of the lake that is closed to the public. The area also contains several other non-historic pump houses and water tanks. All water pump houses and water tanks, except pump #316, are scheduled for removal prior to implementation of this plan (Appendix A). There are no other known Landmark contributing features or cultural resources in the Project Area (Presidio Trust, 2000) though the site is predicted to have prehistoric archeological potential.

2.6 RECREATION AND PUBLIC STEWARDSHIP

The affected environment discussed here includes existing recreational uses, visitor amenities, and community-based stewardship programs in the Project Area.

2.6.1 Visitor Uses

The Project Area is used by the public for wide variety of activities, including hiking, jogging, dog walking, and bird watching, as well as passive contemplative activities (Holtzman and Grosso, 1997). The playground and other developed public access areas corresponding to city property receive the highest level of use. The south end of the lake serves as a popular gathering location for small groups of visitors (Figure 2).

Pedestrians use the paths and trails around the lake heavily. On-leash dog walkers use the north and east perimeter of the lake, mostly on the paved and soft surface trails.[2] Cyclists enter the Project Area from the city property, West Pacific Avenue, or Park Boulevard to the west.

According to responses to Grosso's questionnaire (Holzman and Grosso, 1997) sent out to frequent park users, the natural setting and tranquility of Mountain Lake are highly valued. Mountain Lake has been described as one of the places that makes San Francisco a more livable place (Holzman and Grosso, 1997).

[2] This plan and EA proposes no change to current Presidio-wide regulations.

2.6.2 Volunteer Site Stewardship and Public Interest/Support

Long-term park and community stewards have been active in restoration efforts, and native plant landscaping efforts within the Project Area. The Friends of Mountain Lake Park (FMLP), a neighborhood association consisting of 263 nearby households, has also participated in stewardship activities. The FMLP has advocated water quality improvements and restoration activities within the Project Area and been active in park planning and management. The FMLP has also obtained grant funds to help encourage community involvement in the park's maintenance, and has had a long-term commitment to the Project Area. Their first FMLP newsletter was distributed in 1991. Presidio Park Stewards and volunteers have guided Mountain Lake restoration efforts on NPS land. Other groups that have worked at Mountain Lake include the California Academy of Sciences, University of San Francisco, San Francisco State University, University of California in Berkeley, Golden Gate Audubon, the City of San Francisco, and the California Native Plant Society. Members of the California Academy of Sciences have been long-term stewards of the Project Area and bring school groups to study the lake.

Visitor surveys indicate that the general public is concerned with maintenance and management issues such as water quality, decreasing depth, and garbage removal (Holtzman and Grosso, 1997). Visitors have also been concerned with the preservation of native flora. Overall, 64 percent of the regular visitors agreed that restoration of Mountain Lake and its surrounding natural environment is desirable (Holtzman and Grosso, 1997).

2.7 TRANSPORTATION

The affected environment discussed in this section includes traffic on all trails within the Project Area as well as traffic and parking in the vicinity of the Project Area.

2.7.1 Access

There is no direct access to Mountain Lake by car. However, adjacent Park Presidio Boulevard (Highway 1) is a heavily used road. Indirect access to Mountain Lake is via Highway 1, which intersects Lake Street south of the Park Presidio tunnel. Within the Richmond district, pedestrian access to the park is possible from 8th, 9th, 10th, 11th, 12th, and Funston Avenues, as well as from the Presidio Arguello and 15th Avenue gates.

2.7.2 Parking

Parking for the Project Area is available at the large parking lot immediately inside the 15th Avenue gate and in a smaller parking lot on Wedemeyer Road, which intersects 15th Avenue as it enters the Presidio. Parking is also available immediately west of the Arguello Gate of the Presidio, immediately south of the Golf course. There is also limited 2 hour parking for the Project Area in the residential area on Lake Street between 8th Avenue and Park Presidio Boulevard.

2.7.3 Pedestrian Traffic

The Project Area gets visitor use throughout the day, with peak use in the mornings and evenings. Originating at the 15th Avenue entrance to the Presidio, Wedemeyer Road leads to a paved footpath (along Park Boulevard), which passes under Park Presidio Boulevard and joins West Pacific Avenue at the northern end of the Project Area (Figure 2). West Pacific Avenue extends southward towards the southern border of the golf course (Figure 2). Both Wedermeyer road and West Pacific Avenue form a part of the Juan Bautista De Anza Historic Trail. Paths and trails within the Project Area are popular routes for joggers, dog walkers, and hikers. Because park safety and maintenance crews are the only vehicles allowed in the Project Area, there is little conflict between pedestrians and vehicles. However, some park users have reported conflicts between pedestrian and high-speed bicycle use on paved roads within the Project Area.

2.8 AIR QUALITY

2.8.1 Regulatory Framework for Air Quality

The Bay Area Air Quality Management District (BAAQMD) is the primary agency responsible for enforcing the air quality standards in the Bay Area. State and national ambient air quality standards are mandated under the Clean Air Act, and the California Clean Air Act. Upper limits have been set for ozone, carbon monoxide (CO), nitrogen dioxide (NO2), sulfur dioxide (SO2), particulate matter, and lead, and standards for the particulate matter that can be inhaled. The only known exceedance of standards within the Bay Area is the California PM10 particulate standard. Bay Area PM10 concentrations exceed the California standard, but meet the federal standard. Any exceedances within the Project Area are likely to be the product of heavy traffic on Park Presidio Boulevard.

As part of the GGNRA, the air quality designation for the Presidio is Class II, which corresponds to reduced pollutant concentrations relative to San Francisco's Class III designation. Managers at the Presidio must ensure that project activities meet these air quality standards, and that external sources of pollution are controlled or mitigated to the extent possible to protect air quality and resources values (Presidio Trust, 2000).

2.8.2 Existing Air Quality Conditions

The affected environment discussed in this section is the air quality within the Project Area. The primary source of air pollution in Mountain Lake originates from neighboring Park Presidio Boulevard, which generates carbon monoxide and other vehicle exhaust products. High traffic volumes and congestion occur frequently on Park Presidio Boulevard, introducing pollutants into the Project Area. Levels of these air pollutants may exceed state and federal standards if traffic congestion coincides with stagnant weather conditions (NPS, 1994).

2.9 NOISE

The affected environment discussed in this section is the noise level that exists within the Project Area. The public often mentions existing high levels of noise from Park Presidio Boulevard as a key issue that needs to be addressed at Mountain Lake. Most effective means for addressing this issue, such as the construction of a sound wall along Park Presidio, are outside the scope of the Mountain Lake Enhancement Plan or would have to be implemented by other agencies (e.g., CALTRANS).

In accordance with the GMPA EIS, projects within the Presidio comply with the City of San Francisco noise ordinance. The local ordinance specifies maximum noise levels during construction and other project related activities within the Presidio. The noise ordinance limits construction noise between 7 a.m. and 8 p.m. to 80 decibels at 100 feet distance and between 8 p.m. and 7 a.m. to 5 decibels above the ambient noise levels. Noise levels within the Project Area are high in areas adjacent to Park Presidio Boulevard (Figure 2).

The Presidio Trust is committed to complying with provisions equivalent to the standards articulated in the San Francisco Noise Ordinance. Noise levels within the Project Area are regulated by the San Francisco Noise Ordinance, Article 29 of the San Francisco Police code. Regulations for construction-related noise include:

- Construction noise limited to 80 dBA at 100 feet from the equipment during daytime hours (7 a.m. to 8 p.m.). Impact tools are exempt from the dBA restrictions provided that they are provided with effective mufflers.
- Nighttime construction (8 p.m. to 7 a.m.) that would increase ambient noise activity by 5 dBA or more is prohibited.

2.10 HAZARDOUS SUBSTANCES

The affected environment discussed in this section is the potential for hazardous substances as defined by law within the Project Area.

2.10.1 Regulatory Framework for Hazardous Substances

The Presidio Trust is the lead agency conducting the investigation of whether hazardous substances are present in the Project Area. The California Department of Toxic Substances Control (DTSC) is the lead agency for oversight of the Presidio Trust's investigation and remediation activities. The San Francisco Regional Water Quality Control Board (RWQCB) works in conjunction with the DTSC on issues of water quality and contaminants.

Prior to the Presidio Trust's assuming responsibility as lead agency for Presidio-wide remedial investigations and clean up, the U.S. Army conducted a remedial investigation throughout the Presidio of areas that might contain actionable levels of hazardous chemicals. The Army initiated its

investigations and studies in 1990 and turned them over to the Trust in 1999 when agreement was reached between the Presidio Trust, NPS and Army to transfer responsibility to complete the required studies and clean-up activities to the Presidio Trust. The investigations were conducted in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), and other relevant regulations (Dames and Moore, 1997).

In 1999, the California Department of Toxic Substances Control approved the Trust's request to include remedy selection for Mountain Lake in the planned amendment to the Public Health Service Hospital (PHSH) Record of Decision (ROD). The Trust expects that this amendment or some other satisfactory regulatory decision-document will be completed early 2001. Numerous reports documenting chemicals at the Presidio indicate that hazardous substance cleanup would not be required in the Project Area.

2.10.2 Hazardous Substances at Mountain Lake

An investigation of Mountain Lake was included in the Army's Main Installation Remedial Investigation completed by Dames and Moore in 1997. As part of this study, the Army collected and analyzed lake water and sediment samples, as well as sampled soil from two borings installed adjacent to the lake. Using the RWQCB's Basin Plan water quality objectives for surface waters, the U.S. Army reported that cyanide, lead, and heptachlor levels in Mountain Lake exceeded freshwater quality objectives (Dames & Moore, 1997). The Trust has recently collected additional samples at Mountain Lake to confirm the findings from the Army's investigation.

Sediment data collected from Mountain Lake indicate that lead and cadmium is present in one Mountain Lake sediment sample at a concentration slightly greater than the applicable cleanup goal. However, lead was below the detection limit of 7.44 mg/kg in one sediment sample, and below the background lead concentration of 64 mg/kg in six other sediment samples. The report concluded that once the sediment is homogenized during dredging the sediment would likely not exceed hazardous waste criteria or applicable ecological cleanup levels (Erler and Kalinowski, 1998). Based on these data, elevated lead is not widespread in Mountain Lake sediments.

Low levels of Chemicals of Concern ("COCs") were detected in Mountain Lake water during the Army's RI investigations. The low level concentrations of COC's detected in Mountain Lake were not confirmed during the investigations conducted in 2000. As noted in the RI (Dames & Moore, 1997), Mountain Lake is not considered a potential source of chemicals and is not significantly impacted by other sources. Therefore, no remedial action is expected for Mountain Lake.

2.11 VISUAL RESOURCES

Mountain Lake is a unique and important scenic resource within the Presidio, providing both scenic views and contemplative surroundings to visitors. Currently, the best vista of the lake can be obtained

from the south shore access area. The south shore provides a panoramic view of the lake including the golf course in the background to the north, lush riparian vegetation along the east and north wetland arms, and Park Presidio Boulevard to the west. The north and east shoreline also provide open water vistas with a backdrop to the south of the adjoining neighborhood and the active recreation areas of Mountain Lake Park.

As the only natural lake in the Presidio, the open waters of Mountain Lake provide a unique visual resource. The lake's numerous birds, intimate views, and thickly-vegetated shorelines provide an opportunity for quiet contemplation. Dense stands of willow, eucalyptus, and Monterey cypress border the Juan Bautista de Anza Historic Trail, creating a contemplative, woodland setting for walks.

As beautiful as Mountain Lake is, there are a number of elements that detract from the lake's visual quality. Algae blooms are frequent during the summer, reducing water clarity (Navarett, 1994). Sometimes algae blooms result in fish kills, which further compromise the visual and olfactory quality of the lake. Bare, eroding slopes along the south shore and under the eucalyptus trees along the east shore are unattractive. Invasive exotic weeds such as fennel make the slopes around the lake and along the de Anza Trail look unkempt. Passing cars on Park Presidio Boulevard are visible through gaps in the vegetation, and detract from the visual and auditory ambiance of the lake.

3. Enhancement Alternatives

Details of the Alternatives are discussed in this section. Four Alternatives, including a No Action Alternative, are described for the Project Area, which includes Mountain Lake and surrounding upland areas (Figure 2). The 14.25-acre Project Area includes all of the historic footprint of Mountain Lake east of Park Presidio Boulevard and the adjacent upland areas that have a direct effect on the lake.

3.1 SUMMARY OF PROJECT ELEMENTS

The Alternatives were developed to address the project objectives identified for the Project Area. The Alternatives also take into account the results of public scoping, site analysis, and consultant studies (SFIA, 1998; Horne, 2000).

The actions proposed in the Alternatives would result in improved water quality, enhanced habitat, and a richer visitor experience at Mountain Lake. This is consistent with prior plans for Mountain Lake, which call for the enhancement and protection of the aquatic system and wildlife habitat around the lake (NPS, 1998; NPS, 2000). Additionally, these alternatives specify that improvements to Mountain Lake should provide visitors with safe access to the water for educational and recreational purposes without compromising the lake's natural features and sensitive habitat areas. The Alternatives provide a framework to enhance water quality and the surrounding native plant communities while improving visitor access.

Alternatives 2 and 3 are proposed in phases to limit the visual effects of project-related work, consider financial resources, and address potential site-based jurisdictional constraints (the part of the project that is east of the culvert falls within golf course property). The first phase would occur during the summer, fall and winter of 2001 (July 2001-February 2002). Additional monitoring, weeding, planting, and related follow-up activities are likely to take place after 2002. Future phases are anticipated to occur three to five years after the completion of the first phase.

3.2 PROPOSED ENHANCEMENT ACTIVITIES

Elements of the Alternatives are described in general terms in the following sections. The specific composition of each Alternative is described in Section 3.3. The proposed action is Alternative 2.

3.2.1 DREDGING

Mountain Lake is approximately nine feet deep at the deepest point in the lake. Steep drop-offs occur along the east and west sides of the lake, likely resulting from the addition of Park Presidio fill along the west shore and the removal of rich, organic material from the lake along the east shore. To improve water quality and lake function, dredging is a key element of the enhancement plan. Dredging would remove the top several feet of nutrient-laden sediment from the lake bed, deepen the lake to prevent the rapid invasion of emergent vegetation, increase the volume of water in the lake to dilute nutrients, and prevent rapid heating of the water during hot periods.

The Alternatives include three dredging scenarios, ranging in volume from 6,000 cubic yards (cy) to 14,300 cy. To preserve slope stability and protect existing emergent vegetation, dredging for all alternatives would be confined to the central area of the lake, and would not occur within the following buffers (Figures 6, 7, 8):

- A 110-foot border from the lake's edge would be left undisturbed along the north arm and an 85-foot border would be left undisturbed along the east arm of the lake, to protect existing emergent vegetation
- A 100-foot margin would be left undisturbed along the western shoreline bordering Park Presidio Boulevard.
- A 50-foot margin would be left between the dredged area and the Presidio's jurisdictional boundary with the City of San Francisco.
- A 50-foot buffer would be maintained to protect east shoreline wetlands

In the center of the lake, between the above-defined borders, lake sediment would be dredged at a 1:3 slope until the desired depth is reached, to avoid slumping of sediment from undredged areas. From that point, the lake bottom would be dredged at a shallow gradient of 1:120 until the center of the lake is reached (Figures 6, 7, 8).

The three approaches to dredging are:

- Alternative 1 proposes to remove an average of two feet of sediment from the lake or approximately 6,000 cubic yards. Under this proposal, the lake would be dredged from the buffer inward at a 1:3 slope down to a depth of 9 feet, thereafter gently sloping at 1:120 to a maximum depth of approximately 11 feet. This approach would remove the nutrient-rich upper levels of sediment as well as deepen the lake to discourage the rapid filling of the lake with emergent vegetation. This approach would provide an additional 50 years of lifespan for the lake, calculated using the estimated sedimentation rate of 5 mm/yr (Horne, 2000).

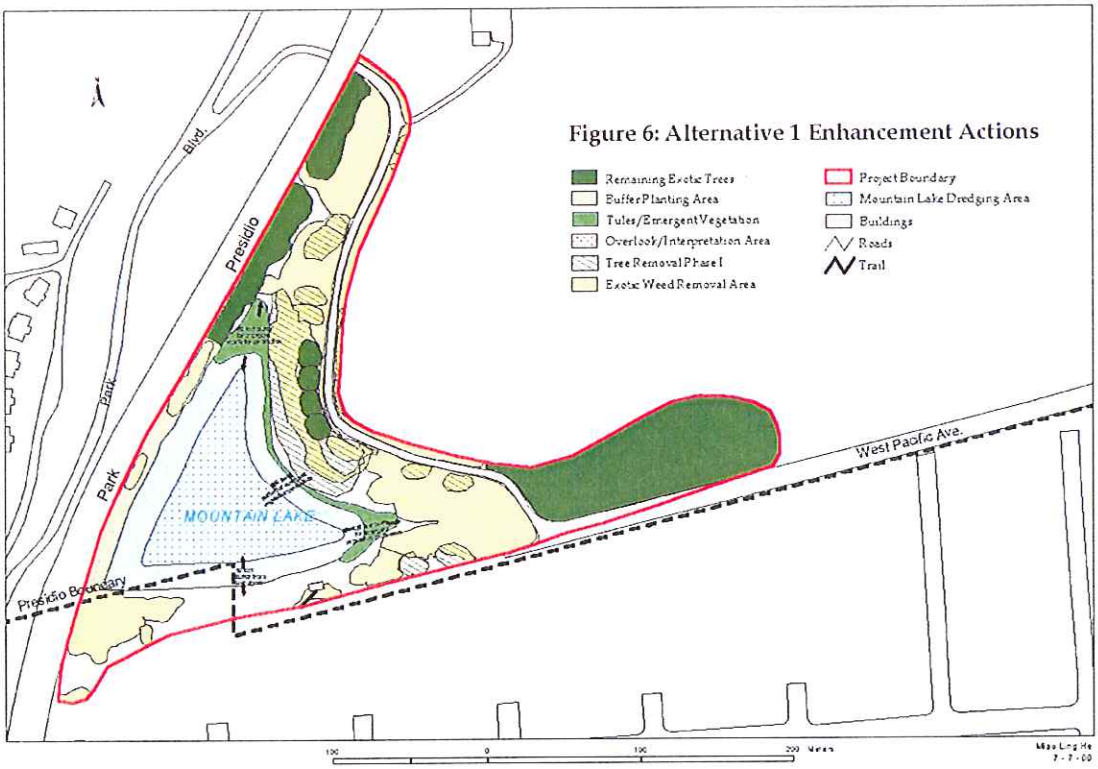


Figure 6: Alternative 1 Enhancement Actions
Remaining Exotic Trees
Buffer Planting Area
Tules/Emergent Vegetation
Overlook/Interpretation Area
Tree Removal Phase I
Exotic Weed Removal Area
Project Boundary
Mountain Lake Dredging Area
Buildings
Roads
Trail
Presidio Blvd.
Park
MOUNTAIN LAKE
West Pacific Ave.
Presidio Boundary

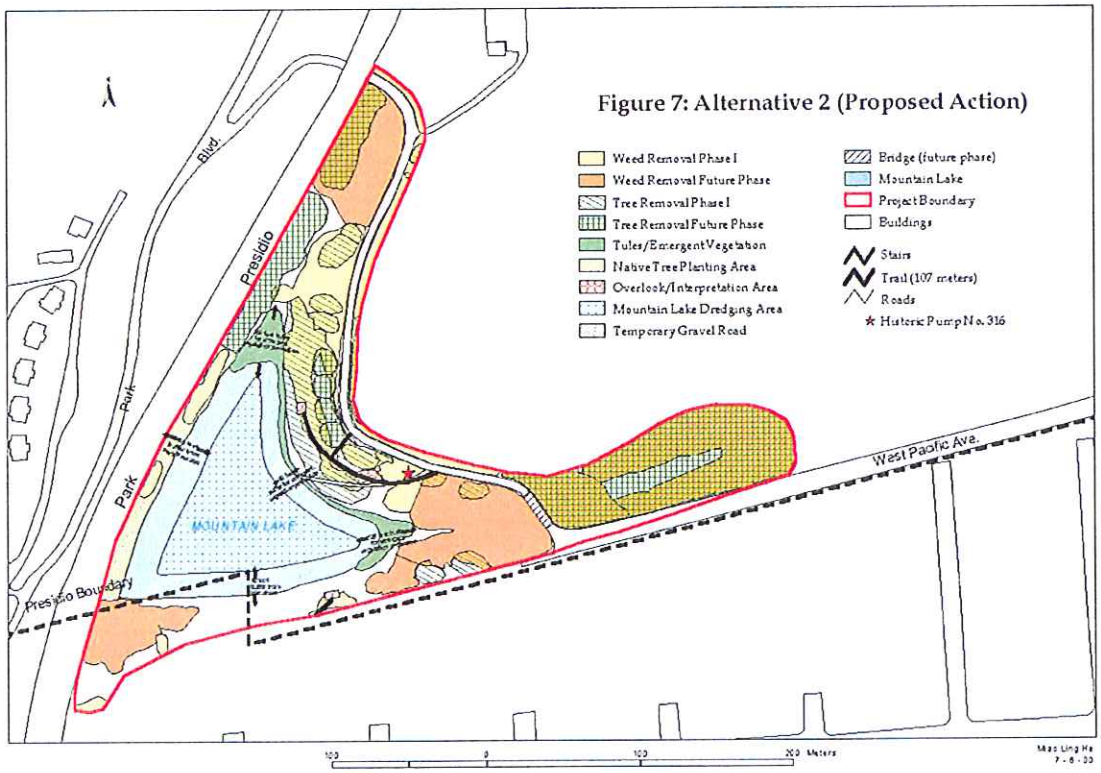


Figure 7: Alternative 2 (Proposed Action)
Weed Removal Phase I
Weed Removal Future Phase
Tree Removal Phase I
Tree Removal Future Phase
Tules/Emergent Vegetation
Native Tree Planting Area
Overlook/Interpretation Area
Mountain Lake Dredging Area
Temporary Gravel Road
Bridge (future phase)
Mountain Lake
Project Boundary
Buildings
Stairs
Trail (107 meters)
Roads
Historic Pump No. 316
Presidio Blvd.
Park
MOUNTAIN LAKE
West Pacific Ave.
Presidio Boundary

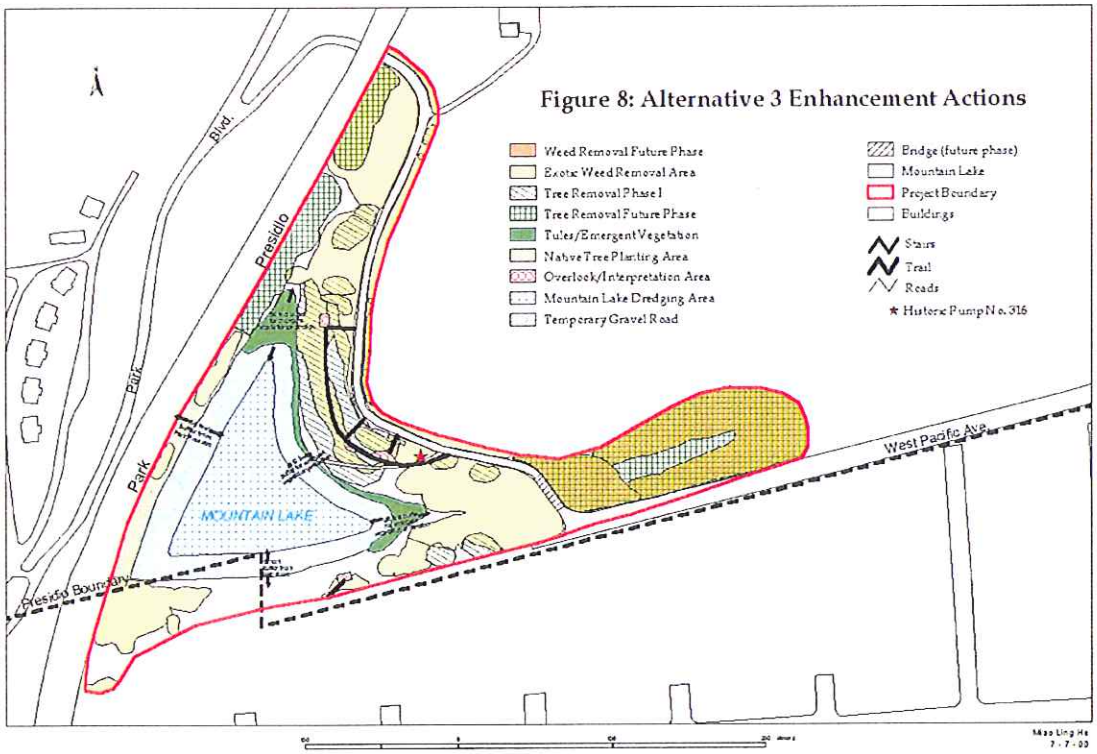


Figure 8: Alternative 3 Enhancement Actions
Weed Removal Future Phase
Exotic Weed Removal Area
Tree Removal Phase I
Tree Removal Future Phase
Tules/Emergent Vegetation
Native Tree Planting Area
Overlook/Interpretation Area
Mountain Lake Dredging Area
Temporary Gravel Road
Bridge (future phase)
Mountain Lake
Project Boundary
Buildings
Stairs
Trail
Roads
Historic Pump No. 316
Presidio Blvd.
Park
MOUNTAIN LAKE
West Pacific Ave.
Presidio Boundary

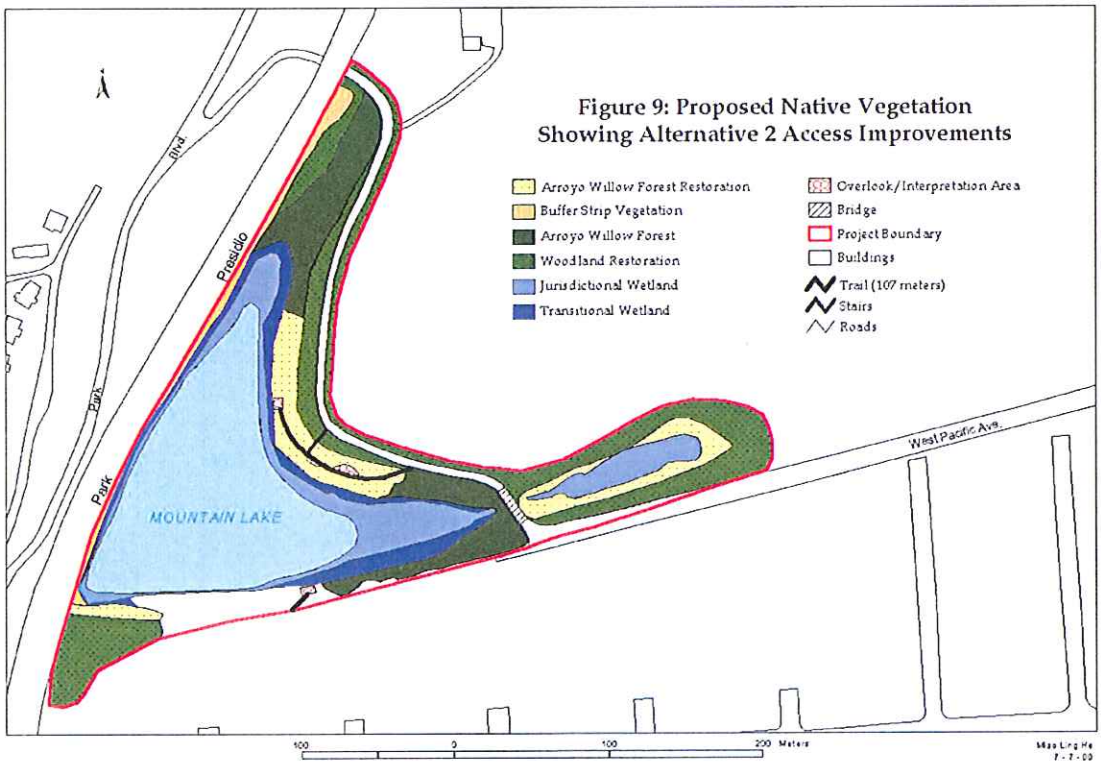


Figure 9: Proposed Native Vegetation
Showing Alternative 2 Access Improvements
Arroyo Willow Forest Restoration
Buffer Strip Vegetation
Arroyo Willow Forest
Woodland Restoration
Jurisdictional Wetland
Transitional Wetland
Overlook/Interpretation Area
Bridge
Project Boundary
Buildings
Trail (107 meters)
Stairs
Roads
Presidio Blvd.
Park
MOUNTAIN LAKE
West Pacific Ave.
100
0
100
200 Meters

- Alternative 2 proposes to remove an average of four feet of sediment from the lake or approximately 11,500 cubic yards. Under this proposal, the lake would be dredged from the buffer inwards at a 1:3 slope down to a depth of 11 feet, thereafter gently sloping at 1:120 to a maximum depth of approximately 13 feet. This approach would remove nutrient-rich upper levels of sediment, deepen the lake to prevent it from filling with emergent vegetation, and provide at least an additional 150 years of lifespan for the lake, estimated using the current sedimentation rate of 5 mm/yr (Horne, 2000).
- Alternative 3 proposes to remove an average of five feet of sediment from the lake, or approximately 13,800 cubic yards. Under this proposal the lake would be dredged from the buffer inwards at a 1:3 slope down to a depth of 12 feet, thereafter gently sloping at 1:120 to a maximum depth of approximately 14 feet. In addition, the upper foot of nutrient rich sediment would be scraped away in the non-sandy areas within the buffer zone, removing an additional 500 cubic yards of nutrient rich sediment from the lake bottom. This approach would deepen the lake sufficiently to prevent emergent vegetation from rapidly filling the lake, and provide at least an additional 200 years of lifespan for the lake. It also would remove most of the nutrient-rich sediment from the lake bottom, further improving lake water quality (Horne, 2000).

These three dredging scenarios were developed based on the incremental benefits of dredging balanced against the impact and cost of removal. Removing less sediment than proposed in the minimum dredging option (Alternative 1) would not remove enough of the nutrient-laden sediment nor make the lake deep enough to prevent the rapid spread of emergent vegetation. Removing more sediment than proposed in the maximum dredging option (Alternative 3), although it would provide additional lifespan for the lake, would not provide proportional benefits for the lake ecosystem (Horne, 2000).

Dredging would occur in late summer and fall, 2001 after exotic trees are cleared from the access route to the lake. A cleared area along the east shore would be temporarily armored with gravel to facilitate access to the lake and create a staging area for the removal of dredge spoils (Figures 6, 7, 8). Gravel would be placed over geotextile fabric to minimize mixing with native soil and facilitate removal after construction. All gravel used to create temporary construction access to the lake would be removed when construction is complete.

Dredging would be conducted either by clamshell removal or hydraulic dredging. In the first approach, lake sediment is removed using a clamshell bucket mounted on a floating barge equipped to maneuver through shallow waters. All dredging equipment would be steam-cleaned prior to avoid introducing exotic species to the Project Area. A dump scow (additional barge) floats alongside the crane barge and receives the dredge materials, which are anticipated to be 40 to 50 percent solid material (a mixture of fine sands, silts, and clay). The dump scow has silt curtains (permeable

railings) that hold back the solids and allow water to drain back into the lake. The dump scow periodically returns to the staging area where a crane unloads dredge material into trucks for immediate transport to the dewatering area. If the staging area cannot hold all of the dredge materials during dewatering, they would be transported in lined trucks to another storage area at the Presidio. The dewatering area would be managed to prevent discharge of decant water. Materials would be allowed to dry for approximately one to three months, depending on weather conditions. Materials would be periodically turned to allow for more efficient drying. After dewatering, dredged sediment would be transported and stored for reuse at the Presidio or disposed off-site.

Lake sediment may also be removed by hydraulic dredging. In this approach, a hydraulic suction dredge moves around the lake on a barge and pumps the sediment into an on-shore silt basin or large trailer mounted tanks that can be hauled off-site. Silt basins would need to be constructed in disturbed upland areas near Mountain Lake, on the existing roadway, or the former tank site. During dewatering, clarified water could be returned to the lake.

To minimize erosion impacts during dredging and subsequent dewatering, best management practices would be implemented. These include measures such as installation of silt fences or placing rice-straw bales downstream from exposed soils; minimizing the surface area of exposed soil; and tarping stockpiled soils, equipment, and materials. To the extent feasible, dredging would be conducted during the late summer and fall before the onset of winter rains (August-November) to minimize erosion.

Dust control measures to be implemented during dredging include several steps recommended by the Bay Area Air Quality Management District. Measures would include watering the site several times daily in dry weather, covering trucks hauling dredged sediment or other construction materials, covering all dry soil stockpiles, and ceasing work when visible dust clouds form. Non toxic soil stabilizers would be used on all unpaved dredging access areas to Mountain Lake. All paved access areas would be swept daily with water sweepers, and streets in the vicinity (e.g., the West Pacific Avenue access to the Project Area) would be swept with water sweepers if soil or dust is carried in that direction.

The Project Area is persistently noisy from automobile traffic on Park Presidio Boulevard. Nonetheless, efforts would be made to reduce temporary increases in on-site noise generation during dredging. These include limiting work to certain hours (daytime during weekdays only) and installation of appropriate noise-reduction equipment on construction equipment. Methods to reduce noise impacts and to minimize potential accidents during dredging include avoiding the south shore of the lake, where the highest density of visitor use occurs, and keeping construction areas off-limits during construction activity. Construction equipment would be brought to the lake from West Pacific Avenue via the Arguello Gate of the Presidio or from the Presidio via the Public Health Service Hospital.

Confirmatory sampling of stockpiled sediments would be conducted to evaluate suitability for proposed reuse sites. A sampling and testing protocol would be submitted for appropriate agency review before confirmation samples are collected. Confirmation samples would be analyzed for chemicals of concern based on previous sampling data. Other analyses may be conducted, such as bioassays and waste extraction tests, depending on the proposed reuse locations (e.g., proximity to wetlands or surface water, depth to groundwater, and the potential for human and ecological exposure). Confirmatory sampling data would be compared with screening criteria appropriate to the proposed disposal/reuse sites. Sediment evaluation and reuse site selection would be conducted in consultation with responsible agencies (e.g., USCOE, RWQCB).

As discussed in Section 2.3.2, sediment testing performed to date indicates that lake sediment is below existing wetland cover criteria for typical background contaminant concentrations (RWQCB, 1992). Additional confirmatory samples would be collected from dredge materials prior to the final selection of reuse and/or disposal sites. Dredged sediments may be temporarily stockpiled for dewatering at the tank area. The stockpile area would be bermed and runoff from the stockpile would be controlled. Depending on the site-specific characteristics of the proposed disposal/reuse locations, stockpiled sediment may be analyzed for inorganic and organic chemicals, leachability (using the modified waste extraction test), and/or toxicity to aquatic organisms.

According to data previously collected (Dames and Moore, 1996; Beutel, 1997; Erler and Kalinowski, 1998), some of the sediments may require special handling or may not be suitable for all reuse alternatives. Because potential on-site reuse areas are adjacent to existing wetlands, regulators may use cover criteria to determine if sediments are suitable for reuse (e.g., 50 mg/kg lead; RWQCB, 1995).

If sediments do not meet applicable soil and/or water quality standards for a given disposal site, treatment may be considered. If treatment is not an option, sediment that is not suitable for the proposed disposal/reuse sites would be placed in an appropriate alternative disposal location, such as a Class II or III landfill. Testing requirements, screening criteria, and disposal locations would be selected in consultation with appropriate agencies, including the USCOE and RWQCB.

3.2.1.1 Sediment Reuse and Disposal

If dredged sediments are determined to be appropriate for on-site reuse at Mountain Lake, approximately 1,000 cubic yards of sediment would be used to recontour the former tank site (Figure 3). If the remaining unused sediments are determined to be acceptable for reuse in other areas of the Presidio, they would be left in an appropriate temporary sediment storage area within the Presidio for later use as needed. Any sediment determined to exceed applicable limits for reuse at the Presidio would be transported to an approved off-site disposal location in consultation with appropriate agencies.

Recontouring would be conducted during phase one following removal of exotic trees and the temporary access road used during dredging. Sediment placement would be limited to the immediate vicinity of the tank area. Appropriate geotechnical criteria for compaction and slope stabilization would be evaulated and used in consultation with a geotechnical engineer. Tests would be conducted to check that placed fill materials and placement design meet appropriate geotechnical criteria for slope stability. No fill placement would take place in USCOE jurisdictional wetland areas.

3.2.2 Mechanical Aeration

A permanent, sustainable, partially solar-powered aeration system is proposed for the deepest water under all three Action Alternatives. Mechanical aeration systems have been used to improve water quality in shallow lakes. Mechanical aeration of the deepest part of the lake would compensate for uncontrollable urban nutrient inputs and nutrient-laden sediment inputs from the unexcavated buffer zones around the edge of the lake. The subsurface aeration unit would consist of a pipe laid along the lake bottom through which dissolved oxygen is introduced into the lake water. This type of aeration system would not be visible from the shore. The aeration unit (approximately 2' x 2') would be sited to avoid or minimize effects to wetland habitats.

3.2.3 Aquatic Habitat Enhancement

Mountain Lake is degraded as a habitat for wildlife (See Sections 2.3.2.2, Water Quality, and 2.4.2.2, Wildlife). Most aquatic species found in Mountain Lake are exotic. There are three potential ways to enhance aquatic habitat at Mountain Lake - through the enhancement of aquatic and wetland vegetation, through the enhancement of common, native aquatic vertebrates, and through the enhancement of special-status, native aquatic vertebrates.

3.2.3.1 Enhancement of Aquatic and Wetland Vegetative Community

Under all three Action Alternatives, enhancements would be made to wetland and aquatic plant communities at Mountain Lake. Plantings would be made along a hydrologic gradient with rooted submergent aquatic beds in deep water, emergent aquatic vegetation (e.g, permanently submerged *Scirpus* spp.) in shallower water, and emergent wetland vegetation that is seasonally submerged (e.g., spikerush) along the shoreline. There are areas where human actions have altered this natural slope along the shoreline. Along the eastern shoreline, a ditch is present between the band of bulrush and upland banks, probably a result of removals of rich shoreline material for use. Limited fill would be placed within this ditch to create a seasonally-inundated wetland and re-establish emergent vegetation. These improvements would increase the habitat for invertebrates and amphibians along the shore.

It is likely that under historic conditions, water clarity was sufficient to allow the establishment of rooted submergent aquatic beds. Typical taxa include pondweeds (*Potamogeton* spp.) and ditchgrass

(*Ruppia* spp.). The ecological benefits of increased submergent vegetation are widely known. Waterfowl commonly forage on submergent vegetation. Various amphibians such as Pacific tree frogs (*Hyla regilla*) use submergent vegetation as egg attachment sites. Invertebrates also use submergent plants for egg laying (e.g., numerous odonate species) and food (e.g., snails).

Efforts to re-establish submergent vegetation would be made, if feasible based on the success of other enhancement actions. Successful re-establishment depends on improved water clarity (Hammer, 1992) from reducing the staining caused by eucalyptus leaves, reducing the standing crop of phytoplankton from increased zooplankton abundance and reduced plant nutrients, and elimination of bottom foraging carp. Failure in any one of these elements could make it difficult to re-establish rooted submergent aquatic beds.

3.2.3.2 Enhancement of Common, Native Aquatic Vertebrates

It is likely that Mountain Lake and adjacent upland areas once provided habitat for common aquatic vertebrates such as the Pacific tree frog, California newt, western toad, and garter snake. Persistent habitat alterations and isolation from donor populations are probable reasons for their absence today.

It is possible that habitat improvements proposed in under all three Action Alternatives could allow for the re-establishment of some of these common, native aquatic vertebrates. However, their re-establishment may have minimal value to the viability of the species throughout its range because of habitat isolation. Nonetheless, the educational benefits may be sufficient alone to pursue their re-establishment.

Newts would be the easiest to re-establish and are quite charismatic. Adult newts are generally considered toxic and have few repeat predators. Adult newts successfully reproduce in artificial ponds in Marin County that contain non-native bullfrogs and fish. However, the amount of existing and proposed riparian and upland habitat may be insufficient in area to allow for a sustainable, long-term population at Mountain Lake. In addition, management practices on the adjacent golf course and vehicular traffic on the adjacent Park Presidio Boulevard would pose mortality problems and would require fencing or other measures to restrict newt access. The reintroduction of common native aquatic fauna may be considered, pending the success of other habitat enhancements proposed in this plan.

3.2.3.3 Enhancement of Special-Status, Native Aquatic Vertebrates

The enhancement of Mountain Lake could represent an opportunity to re-establish two special status species, the red-legged frog (*Rana aurora draytoni*) and western pond turtle (*Clemmys marmorata pallida*). A detailed discussion of why these species are not proposed for reintroduction to Mountain Lake is included in Appendix C. Although none of the Action Alternatives call for the re-introduction of these species at this time, reintroductions may be proposed in the future. If and when

reintroduction is proposed, additional environmental review and agency consultation would be required.

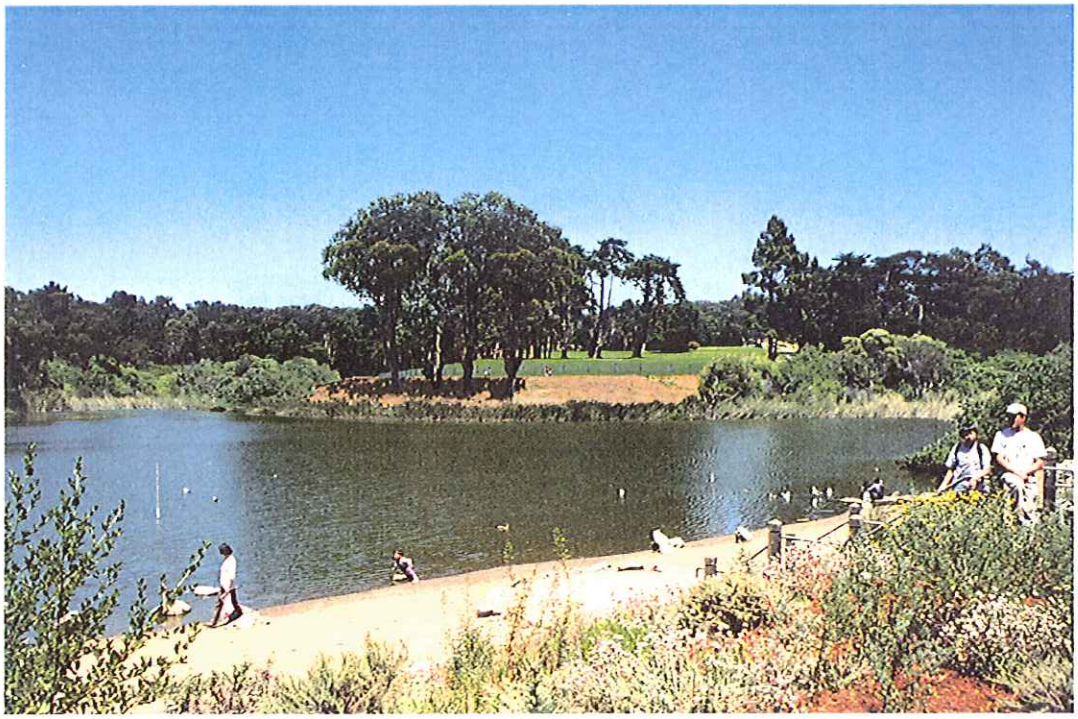
3.2.4 Exotic Tree Removal/Native Plant Community Enhancement

The removal of exotic trees is proposed in each of the Alternatives for the purpose of improving water quality (Horne, 2000; Laws, pers. comm.; Moral and Muller, 1969) and to enhance native habitat values around Mountain Lake. Exotic trees currently grow in areas around Mountain Lake that would otherwise support native wetland, riparian, and woodland communities (Figure 4).

The timing and scope of tree removal activities is distinct for each Alternative (Figures 6, 7, 8). The Alternatives include partial, phased, and full removal approaches to the eucalyptus grove along the east shore. The visual impact of these approaches has been modeled using photo simulations (Figures 10, 11, 12). The Alternatives include:

- Alternative 1 takes a partial removal approach to exotic trees (Figures 7 and 10). It proposes to remove the portion of the eucalyptus along the east shore closest to the lake (1.36 acres). Under this Alternative, the four large eucalyptus trees along the de Anza Trail (0.29 acres), exotic trees along the north end of Park Presidio Boulevard (0.75 acres) and exotic trees east of the culvert (2.05 acres) would be permanently retained. Areas along the east shore where trees are removed would be revegetated with freshwater wetland, riparian woodland, and upland woodland species (1.36 acres) (Figure 9).
- Alternative 2 takes a phased approach to the removal of exotic trees (Figures 8 and 11). It proposes to remove the portion of the eucalyptus along the east shore closest to the lake (1.36 acres) during the first phase of tree removals, leaving the four large eucalyptus trees along the de Anza Trail (0.29 acres) for a later phase of removal. During subsequent phases of tree removal, the four remaining eucalyptus along the east shore (0.29 acres), exotic trees along the north end of Park Presidio Boulevard (0.75 acres), and exotic trees east of the culvert (2.05 acres) would be removed. Areas where trees are removed would be revegetated with freshwater wetland, riparian woodland, and upland woodland species (4.45 acres total).
- Alternative 3 takes a one-time, full removal approach to exotic trees (Figures 8 and 12). It proposes to remove all eucalyptus along the east shore (1.65 acres) and exotic trees beyond the east arm culvert (2.05 acres) in one phase. During subsequent phases, exotic trees along the north end of Park Presidio Boulevard (0.75 acres) would be removed. Areas where trees are removed would be revegetated with freshwater wetland, riparian woodland, and upland woodland species (4.45 acres total).

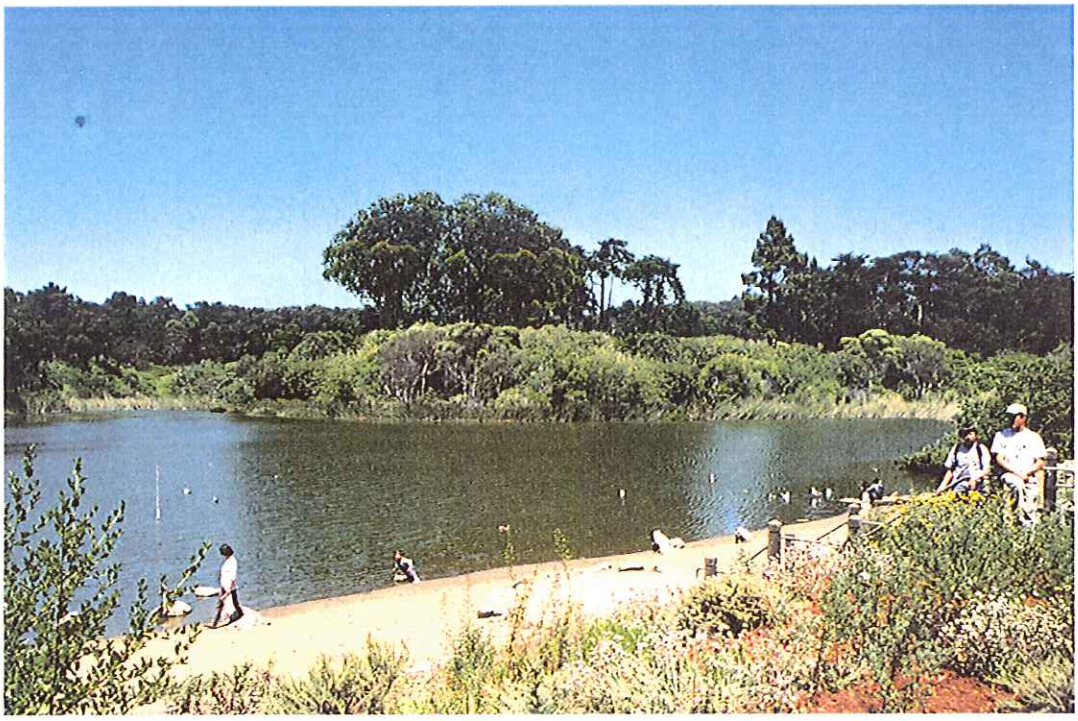
a. Existing Conditions



b. After Implementation

Figure 10: Partial Tree Removal (Alternative 1) (page 1 of 2)

c. After 5 Years



d. After 20 Years

Figure 10: Partial Tree Removal (Alternative 1) (page 2 of 2)

a. Existing Conditions

b. After Implementation

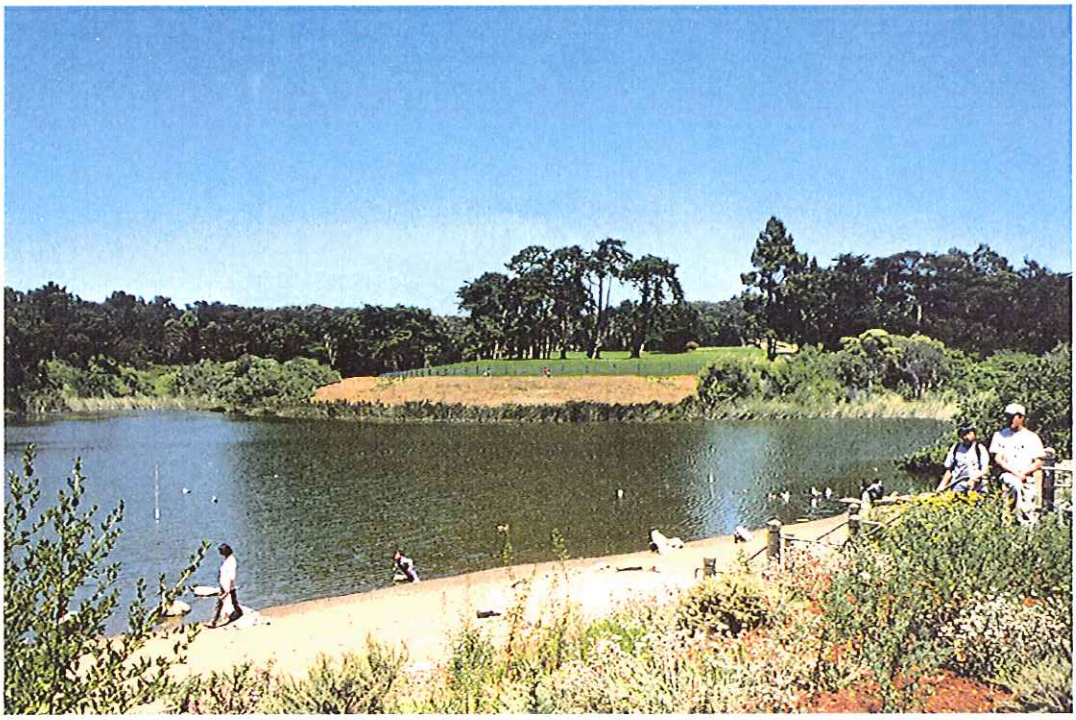
Figure 11: Phased Tree Removal (Alternative 2) (page 1 of 2)

c. After 5 Years

d. After 20 Years

Figure 11: Phased Tree Removal (Alternative 2) (page 2 of 2)

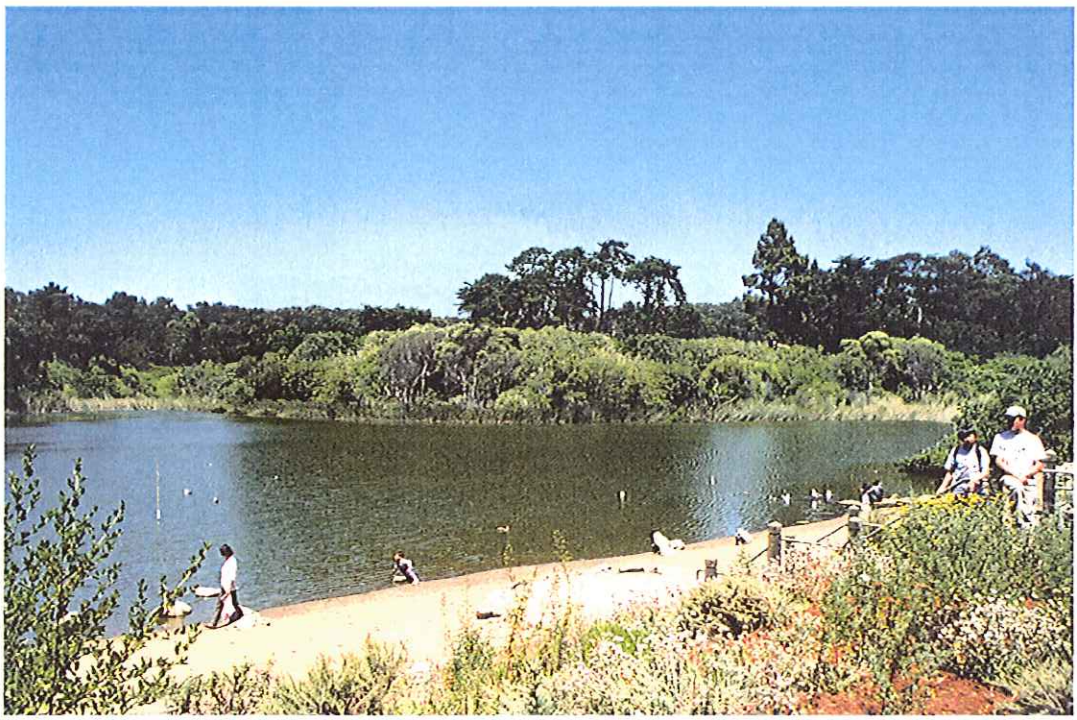
a. Existing Conditions



b. After Implementation

Figure 12: Full Tree Removal (Alternative 3) (page 1 of 2)

c. After 5 Years



d. After 20 Years

Figure 12: Full Tree Removal (Alternative 3) (page 2 of 2)

Tree removal techniques would be assessed carefully on a case-by-case basis. Techniques range from complete root ball removal to flush cutting trunks at ground level with subsequent management so that no regrowth occurs. Where erosion or archeological sensitivity is a concern, removal techniques minimizing soil disturbance would be used. If required, cartridges containing an appropriate agency-approved herbicide (such as Rodeo or Roundup) would be injected into tree stumps to inhibit regrowth. This method ensures that the applied pesticide is contained within the stump. Removed trees would either be recycled as mulch or transported to an appropriate storage area within the Presidio for future reuse.

To minimize the erosion impacts of tree removal, best management practices, such as those recommended in RWQCB protocols, would be implemented during and after. These include measures such as installation of silt fences or placing rice-straw bales downstream from exposed soils; minimizing the surface area of exposed soil; and tarping stockpiled soils, equipment, and materials. To the extent feasible, tree removal would be conducted during the summer and fall before the onset of winter rains (August-November) to minimize erosion.

Disturbance to some wildlife species may occur during tree removals. Most birds using the Project Area have large home ranges (Small, 1974). Adjacent or nearby habitat is available for many of these species. Areas such as Crissy Field could provide temporary alternate habitat for shorebirds and waterfowl, and the riparian corridor along Lobos Creek within the Mountain Lake watershed would provide good habitat for songbirds. Revegetation could provide suitable nesting sites for species such as the yellow warbler. The period between February and August represents nesting season for most birds that might occur within the Project Area. Impacts to birds would be minimized by working primarily between August and February, outside of the period during which birds breed. Exceptions include weed removal activities and follow up requirements, which would be localized in one area to minimize potential impacts.

Following tree and other weed removal activities, the site would be recontoured as needed, and the trail and overlooks would be constructed. Within the upland areas, appropriate clean fill material would be used to fill any holes left by stump removal. Prior to the placement of any new soil, it would be tested to ensure that it can support the appropriate plant species targeted for revegetation. Existing soils would also be tested to determine what treatments may be necessary to reduce the impacts left from the eucalyptus trees.

For all of the Alternatives, revegetation would begin during fall 2001, after the exotic trees are removed. The revegetation planting palette (Appendix F) was selected based on analysis of existing remnant vegetation communities at Mountain Lake, paleoecological data, historical references, literature reviews, communication with local experts, and an examination of similar ecosystems found within the region, such as Lake Merced (Reidy, 1999; Holloran, pers comm.). Cattails, bulrushes, sedges, and other wetland species would be planted in the freshwater wetland areas. Plantings in

riparian woodland areas would include Arroyo and yellow willow (*Salix lasiolepis* and *S. lucida* ssp. *lasiandra*), American dogwood *(Cornus sericea)*, red alder (*Alnus rubra*), and wax myrtle (*Myrica californica*). In oak woodland areas, species include buckeye *(Aesculus californica)*, Pacific madrone *(Arbutus menziesii)*, and coast live oak (Quercus agrifolia. Most of these native plants can be found in various habitats on the Presdio. All plant material would be propagated from Presidio sources, to prevent contamination of the existing native plant gene pool. However, species that have been extirpated from the Presidio would be reintroduced from areas on the San Francisco Peninsula or Marin County, if local propagules are unavailable.

To protect newly planted vegetation, all native plantings would be temporarily fenced while vegetation becomes established. Guidelines for public access would be clearly posted. New east shore overlooks would be surrounded by dense willow riparian and native woodland, thereby minimizing visitor impacts and encouraging passive recreational use and educational opportunities in the area. Fencing and signage would be provided to discourage entry into sensitive habitats.

Supplemental planting may be required if the revegetation survivorship rate is less than 80%. Survivorship monitoring would continue for 2 years after each planting phase. Revegetation areas would be also be monitored annually to document the success of revegetation efforts and to document the changes in plant community composition. Monitoring for success of plantings would continue after all plantings are completed.

Additional weeding would be required both in the exotic tree removal areas and throughout the Project Area to ensure that other invasive species do not establish in the areas where the trees are removed and that invasive species do not continue to spread into existing native habitats. The removal of early colonizing weeds is critical to ensure that new plantings survive. Mulch may be applied to the newly planted area to suppress the establishment of invasive weed species. Weeding would be conducted in small, localized sub-areas so that alternative habitats are available within the Project Area. Weed removal efforts would continue at least through the monitoring period. After weed removal, erosion control measures would be used when necessary on steeper slopes where exotic plants are dominant (e.g., periwinkle and Himalayan blackberry along West Pacific Avenue to the east of Mountain Lake; Figure 4) and where soil is likely to erode. Rehabilitation of native plant communities is a long-term benefit that would decrease soil erosion to below current levels in sparsely vegetated areas along the east shore.

Exotic weed removal would be phased. The revegetation strategy described above would be adopted (and amended if necessary based upon the evaluation of monitoring data) for future exotic tree and weed removals. Exotic weed removal and containment would take place and continue throughout all phases of the project. Exotic species removal would be conducted in accordance with best management practices.

3.2.4.1 Cape Ivy Removal and Containment

Under all three Alternatives, Cape ivy will be contained and removed. The expansion of Cape ivy at Mountain Lake represents perhaps the most significant threat to the health of the riparian and upland vegetation. Cape ivy (*Delairea odorata*), formerly referred to as German ivy (*Senecio mikanioides*), is an invasive introduced vine that currently infests every plant community on the Presidio. Cape ivy grows vegetatively as a vine, and fragments as short as one half inch, carried by runoff, landscape machinery and humans, can take root and grow rapidly, colonizing new areas. Growth rates of individual plants and populations have been measured at several locations with individual stems averaging one foot of growth per month (Alvarez, 1995; Farrell, 1994; Hillis, 1994).

Cape ivy causes significant reductions in vascular plant species richness, and is known to have reduced the abundance of several insect orders (*Coleoptera* and *Diptera*) for two GGNRA riparian plant communities. This could affect those species dependent on insects as food (Fisher, 1997). Because Cape ivy reduces plant diversity and alters vegetation structure, it may affect other community level properties such as providing habitat for pollinators, insects and birds, as well as ecosystem level functions like nutrient cycling and food web dynamics.

There is also evidence that the pyrrolizidine alkaloids found in Cape ivy may have a toxic effect on sensitive aquatic wildlife. Controlling Cape ivy would require a long-term integrated pest management approach. This strategy would involve a combination of hand removal techniques, mechanical control measures (such as power equipment); combined with limited use of approved herbicides when necessary. Cape ivy removal would be phased over a 3-5 year period. Removal requires a step-by-step containment process:

1. Verify that the containment process would not adversely affect rare plants and animals or seasonal wildlife activities in the Project Area.
2. Remove dead woody debris and garbage from targeted containment lines (containment lines are usually 1-2 meters wide and consist primarily of herbaceous plants, topped shrubs and limbed trees.)
3. If necessary reduce the stature of woody shrubs by cutting them to within one foot of ground level with hand tools, mechanical or hedge trimmers. Minimize cutting native shrubs or trees as much as possible by removing lower limbs only.
4. Appropriately dispose of woody debris (recycle in yard waste containers) mulch if necessary on steep slopes to prevent erosion and to minimize nonnative plant establishment.
5. Conduct follow-up hand removal on 8-week intervals, and remove any Cape-ivy that has entered or resprouted in the containment zone. The follow-up schedule would depend somewhat on the habitat and season.
6. Each season continue containment efforts by working toward the center of the patch.

All removal areas would be revegetated with species from the appropriate native plant community (Appendix F). Follow up activities required for maintenance of weed removal sites (e.g., resprout and seedling removal efforts) would be conducted on a case by case basis. Follow-up activities may be required to ensure the eradication of Cape ivy.

3.2.5 Tree Planting along Park Presidio Boulevard

In all three of the Action Alternatives, trees would be planted between Mountain Lake and Park Presidio Boulevard to screen highway traffic and diversify existing vegetation. The existing eucalyptus in along Park Presidio Boulevard would not be removed because they provide a screen between Mountain Lake and Park Presidio Boulevard, and because the species planted there (*Eucalyptus camaldulensis*) is not invasive and has a low standing biomass of leaves to drop into the lake. Tree species to be planted include red alder (*Alnus rubra*), holly-leafed cherry *(Prunus ilicifolia)*, California wax myrtle (*Myrica californica*), blue elderberry (*Sambucus mexicana*), bay laurel (*Umbellularia californica*), toyon (*Heteromeles arbutifolia*), big-leaf maple (*Acer macrophyllum*), Pacific madrone (*Arbutus menziesii*), coast live oak (*Quercus agrifolia*), and yellow willow (*Salix lucida ssp. lasiandra).* Alder, wax myrtle, cherry, maple, and willow are fast-growing species that would quickly screen the roadway and most of the buildings beyond. Wax myrtle, bay, oak, and toyon are slower-growing but longer-lived species. All tree planting in this area would occur during phase one of all Alternatives. A photo simulation showing these plantings after twenty years are shown in Figure 13.

3.2.6 Protection of Cultural Resources

All three of the Action Alternatives include the stabilization of historic pump #316 and the non-historic pump structure within which it is located. Other than pump #316, there are no known cultural resources of significance or potential significance where construction related activity would take place within the Project Area. However, there may be unknown historic or archeological resources buried at the Project Area that could be affected by construction activities. As a result, an Archeological Management Assessment and Monitoring Program (AMA) would be conducted under all three Alternatives.

3.2.6.1 Archeological Management Assessment and Monitoring Program

An Archeological Management Assessment and Monitoring Program (AMA) would be conducted prior to implementation of the Mountain Lake Enhancement Plan. The AMA would inventory known archeological sites in the Project Area, and include test excavations as appropriate, to determine if significant sites or historic features exist and if construction might adversely affect archeological resources. Reports of any investigations would be submitted to the State Historic Preservation Office

a. Existing Conditions

d. After 20 Years

Figure 13: Revegetation Along Park Presidio Boulevard (All Action Alternatives)

(SHPO) and the Advisory Council on Historic Preservation (ACHP). A phased inventory, evaluation, monitoring, and treatment program for archeological resources regarding construction and ongoing maintenance at Mountain Lake would be conducted.

3.2.6.2 Discoveries During Construction

Under all three Alternatives, during the construction phases of the project, professional archeological monitoring would occur to ensure that any unanticipated, post-review discoveries are treated appropriately. If any archeological or other historic resources are unexpectedly discovered during the construction process, the SHPO and the ACHP would be notified and the protocols outlined in 36 CFR Part 800.13 (Post Discoveries) would be followed. The discovery of any human remains or associated mortuary items covered under the Native American Graves Protection and Repatriation Act would be treated in accordance with 43 CFR 10.4 (Inadvertent discoveries). Consultation and work would be conducted in accordance with the programmatic agreement that constitutes the Section 106 compliance for the Presidio General Management Plan Amendment.

3.2.7 Construction of East Shore Trail and Overlooks

A new trail and three overlooks are proposed for construction in the former tank site and the exotic tree removal area along the east shore in Alternatives 2 and 3 (Figures 7 and 8). The new east shore trail and overlooks are being constructed in areas currently dominated by exotics (e.g. eucalyptus) to avoid impacts to existing riparian and wetland habitats. The trail would begin at the east end of the existing tank site and slowly descend as it parallels the east shore. Adjacent to historic pump #316, a small group seating area would be built. The group seating area includes a low seat wall, a small, non-irrigated grassy slope for seating, and a site for future wayside construction. Above this overlook would be woodland. Below this overlook would be riparian woodland (Figure 9). This overlook would provide a sunny, well-protected site for small group interpretation, and an opportunity to interpret Mountain Lake's ecology and history.

A second overlook would located north of the first overlook on an existing bluff within the exotic tree removal area in Alternatives 2 and 3. Once exotic tree removal is complete, this site would provide a view over Mountain Lake and an opportunity to observe nearby willow riparian woodland. This overlook would include a low seat wall facing the lake and provision for future wayside panels. A new rustic-style staircase would connect this overlook to the existing main road. Bare areas surrounding this overlook would be restored with riparian woodland species (Figure 9).

The spur trail continues its descent through an area that would be planted with riparian woodland species. Mountain Lake would be visible through the vegetation. The trail ends at an overlook with benches where the lake and adjacent wetland vegetation is visible. The trail would be signed to protect waterfowl and other bird species during nesting season. Guardrails would be constructed along the trail for public safety and to protect planted native vegetation until it is established.

To minimize erosion impacts during construction, best management practices would be implemented. These include measures such as installation of silt fences or rice-straw bales downstream from exposed soils; minimizing the surface area of exposed soil; and tarping stockpiled soils, equipment, and materials. To the extent feasible, trail construction would be conducted during the late summer and fall before the onset of winter rains (August-November) to minimize erosion.

3.2.8 Construction of South Shore Interpretive Overlook

In all three Alternatives (Figures 6, 7, 8), a small overlook would be constructed in a currently degraded upland area along the south shore of Mountain Lake. This overlook would have a full view of the lake, providing a perfect opportunity to interpret the lake and it's history. The overlook would include benches and provision for future wayside panels. This overlook would be designed to meet ADA guidelines. The existing degraded slopes on either side of the overlook would be weeded and replanted with native riparian woodland species.

3.2.9 East-Arm Culvert Removal and Bridge Installation

A culvert currently connects the east arm of Mountain Lake to the seasonal wetlands further east (Figure 2). The paved part of the Juan Bautista De Anza Historic Trail (West Pacific Avenue) crosses over the east-arm culvert. In Alternatives 2 and 3, the culvert, the section of paved road over the culvert, and the fill that supports the road would be removed to reconnect the two wetland areas. A pedestrian bridge (approximately 40 feet long and 15 feet wide) would be built to replace the existing road. Areas where fill is removed would be revegetated with appropriate native wetland and riparian woodland species.

3.2.10 Adaptive Management of the Lake

Under all three Alternatives, after the completion of phase one of enhancement (dredging, exotic plant removal, and revegetation), Mountain Lake would be monitored and observed for several years for algae bloom activity. Depending on the phytoplankton abundance and the frequency of algae blooms, the need to implement adaptive management strategies such as the removal of exotic fauna would be evaluated. These project components would be designed based on observed conditions at Mountain Lake after the completion of phase one enhancement activities.

The removal of certain types of exotic fish can reverse eutrophication in small lakes (Horne, 2000). Such removals can contribute to an increased abundance of zooplankton that forage on phytoplankton, thereby keeping phytoplankton levels low in Mountain Lake (Horne, 2000). Removals also eliminate carp "rooting" behavior, which eliminates emergent vegetation and adds nutrients to the water. Eliminating carp can decrease the likelihood of algae bloom occurrence (Horne, 2000; Codemo, 1996). Exotic fish removals can also facilitate the growth of submergent vegetation and the re-establishment of native aquatic organisms (See Sections 3.2.3.1, 3.2.3.2, and Appendix B). Exotic

fish would be removed using any of a number of techniques, which are described in Appendix B. Subsequent monitoring would be used to measure the success of these removals at achieving the proper balance and to determine whether or not additional removals are warranted.

3.3 DESCRIPTION OF ALTERNATIVES

The Alternatives for the enhancement of Mountain Lake that follow were developed to explore the range of issues raised during public scoping, agency consultations, and staff analysis. Actions that were suggested in this process, but were not consistent with the project objectives as outlined in Section 1.1.4 are addressed in Section 3.4.

Some actions are common to all three Alternatives. Actions common to all three Alternatives include:

- The strategy for sediment re-use
- Stabilization of historic pump #316
- Planting along Park Presidio Boulevard
- Future adaptive management of the lake
- Ongoing vegetation management activities

However, the three Alternatives vary in terms of:

- Dredging
- Exotic tree and weed removal
- East arm culvert removal
- Extent and phasing of revegetation
- Visitor access.

The Alternatives are described below and summarized in Table 1. The Proposed Action is Alternative 2.

TABLE 1: MATRIX COMPARING THE PROJECT ALTERNATIVES

	ALTERNATIVE 1	ALTERNATIVE 2 (PROPOSED)	ALTERNATIVE 3
DREDGING OF SEDIMENT	First phase removal of 6000 cy to increase maximum depth to 11'	First phase removal of 11,500 cy to increase maximum depth to 13'	First phase removal of 14,300 cy to increase maximum depth to 14'
EXOTIC TREE REMOVAL	First phase removal of trees along east shore (1.36 ac) Permanent retention of four large eucalyptus along roadway, exotic trees along north end of Park Presidio and east of culvert	First phase removal of trees along east shore (1.36 ac) Future phase removal of eucalyptus along roadway (0.29 ac), trees east of culvert (2.05 ac) and along north end of Park Presidio (0.75 ac)	First phase removal of trees along east shore (1.65 ac) and trees east of culvert (2.05 ac) Future phase removal of exotic trees along north end of Park Presidio (0.75 ac)
EXOTIC WEED REMOVAL	First phase removal of weeds in tree removal area (2 ac). Cape ivy removal (0.7 ac)	First phase removal of weeds in tree removal area (2 ac). Cape ivy removal (0.7 ac) Future phase removal of weeds east of culvert (1.8 ac) and in habitats (1.8 ac)	First phase removal of weeds in tree removal area (2 ac) and east of culvert (1.8 ac). Cape ivy removal (0.7 ac) Future phase removal of weeds in habitats (1.8 ac)
NATIVE SPECIES PLANTINGS	Revegetation of tree and weed removal areas with native species.	Revegetation of tree and weed removal areas with native species.	Revegetation of tree and weed removal areas with native species.
PLANTING ALONG PARK PRESIDIO	First phase planting of dense trees to buffer lake (0.41 ac). Existing eucalyptus are retained.	First phase planting of dense trees to buffer lake (0.41 ac). Existing eucalyptus are retained.	First phase planting of dense trees to buffer lake (0.41 ac). Existing eucalyptus are retained.
VISITOR ACCESS	First phase construction of south shore overlook. Existing undefined access under 4 eucalyptus.	First phase construction of south shore overlook and a new 300' unpaved trail with three overlooks along east shore.	First phase construction of south shore overlook and a new 490' unpaved trail with three overlooks along east shore.
EAST ARM CULVERT	None	Future phase replace culvert and road with a bridge to connect the east arm with Mountain Lake.	First phase replace culvert and road with a bridge to connect the east arm with Mountain Lake.

3.3.1 ALTERNATIVE 1

Elements of Alternative 1 are shown in Figure 6 and are discussed below. All actions in Alternative 1 would be implemented in one phase except for future adaptive management of the lake and ongoing weed removal and revegetation activities. A detailed description of each action is provided in Section 3.2.

- Dredging of 6,000 cubic yards of sediment to increase the depth of the lake by an average of two feet, to a maximum depth of eleven feet
- Mechanical aeration of the deep water in Mountain Lake
- On-site reuse of 1,000 cubic yards of sediment, and disposal or reuse of 5000 cubic yards of sediment at the Presidio or an appropriate off-site location
- Stabilization of historic pump #316
- Removal of 85 eucalyptus, 4 Monterey pines, 5 Monterey cypress, and 2 Canary Island pine trees along the east shore of Mountain Lake (1.36 acres)
- Weed removal in and adjacent to the tree removal area (2 acres). Containment and removal of Cape ivy at Mountain Lake (0.7 acres)
- Revegetation in exotic tree and weed removal areas with native freshwater wetland and willow riparian forest species
- Native tree planting along Park Presidio Boulevard to screen the road (.41 acres)
- Construction of a south shore overlook
- Adaptive management of the lake

3.3.2 Alternative 2 (Proposed Action)

Elements of Alternative 2 (Proposed Action) are presented in Figure 7 and are discussed below. Actions are divided into first phase and future phase actions. A detailed description of each action is provided in Section 3.2.

First Phase

- Dredging of 11,500 cubic yards of sediment to increase the depth of the lake by an average of four feet, to a maximum depth of thirteen feet.
- Mechanical aeration of the deep water in Mountain Lake
- On-site reuse of 1,000 cubic yards of sediment, and disposal or reuse of 10,5000 cubic yards of sediment at the Presidio or an appropriate off-site location
- Stabilization of historic pump #316
- Removal of 85 eucalyptus, 4 Monterey pines, 5 Monterey cypress, and 2 Canary Island pine trees along the east shore of Mountain Lake (1.36 acres)
- Weed removal in and adjacent to the tree removal area (2 acres). Containment and removal of Cape ivy at Mountain Lake (0.7 acres)

- Revegetation of tree and weed removal areas with native freshwater wetland, willow riparian forest and upland woodland species
- Native tree planting along Park Presidio Boulevard to screen the road (.41 acres)
- Construction of a south shore overlook
- Construction of an unpaved (300') trail with three overlooks along the east shore
- Adaptive management of the lake

Future Phases

- Removal of four remaining eucalyptus trees along the east shore (0.29 acres), exotic trees east of the culvert (2.05 acres), and trees along the north end of Park Presidio Boulevard (0.75 acres).
- Phased removal of additional exotic weeds (4.3 acres)
- Revegetation of tree and weed removal areas with native freshwater wetland, willow riparian forest and upland woodland species
- Removal of east arm culvert and replacement with a bridge

3.3.3 ALTERNATIVE 3

Elements of Alternative 3 are presented in Figure 8 and are discussed below. Actions are divided into first phase and future phase actions. A detailed description of each action is provided in Section 3.2.

First Phase

- Dredging of 13,800 cubic yards of sediment to increase the depth of the lake by an average of 5 feet, to a maximum depth of fourteen feet. Removal of the top one foot of sediment from the buffer areas (an additional 500 cubic yards of material).
- Mechanical aeration of the deep water in Mountain Lake
- On-site reuse of 1,000 cubic yards of sediment, and disposal or reuse of 13,300 cubic yards of sediment at the Presidio or an appropriate off-site location
- Stabilization of historic pump #316
- Removal of all exotic trees along the east shore of Mountain Lake (1.65 acres) and east of the culvert (2.05 acres).
- Weed removal in and adjacent to the tree removal area (2 acres) and in the area east of the culvert (1.8 acres). Containment and removal of Cape ivy at Mountain Lake (0.7 acres)
- Revegetation of tree and weed removal areas with native freshwater wetland, willow riparian forest and upland woodland species

- Native tree planting along Park Presidio Boulevard to screen the road (.41 acres)
- Construction of a south shore overlook
- Construction of an unpaved (490') trail with three overlooks along the east shore
- Removal of east arm culvert and replacement with a bridge
- Adaptive management of the lake

Future Phases

- Removal of exotic trees along the north end of Park Presidio (0.75 acres).
- Phased removal of exotic weeds in existing wetland and willow habitat (1.8 acres)
- Revegetation of tree and weed removal areas with native freshwater wetland, willow riparian forest and upland woodland species

3.3.4 No Action Alternative

No enhancement actions are proposed under the No Action Alternative. The Project Area would continue to be managed in an "as is" condition. Resource management would be limited primarily to pretection of extisting native plant habitats and sensitive species. No actions would be taken to expand visitor opportunities.

3.4 ALTERNATIVES CONSIDERED BUT REJECTED

The following Alternatives were considered during the planning process but rejected as incompatible with the project objectives or outside the scope of this project.

3.4.1 Adding Unconsolidated Fill to the Beach along the South Shore

During public scoping it was suggested that additional fill material should be deposited on the beach along the south shore of Mountain Lake to replace material that has sloughed into the lake over time. This idea was rejected as being incompatible with the objective of reducing sedimentation into the lake.

3.4.2 Re-introduction of Special Status Aquatic Species to Mountain Lake

The enhancement of Mountain Lake could represent an opportunity to re-establish two special status native fauna, the red-legged frog and western pond turtle. Both species are thought to have previously existed within the Project Area. Neither species is found at Mountain Lake due to a combination of factors, including habitat destruction, low habitat quality, and predation by exotic fish and bullfrogs in the lake. Because of these constraints, there are no plans to reintroduce either species at this time

(Appendix C). However, the success of habitat enhancements included in this plan may make reintroductions feasible in the future. If and when reintroduction is proposed, additional environmental review and agency consultation would be required.

3.4.3 Creating Visitor Access into Existing Habitat Areas

During public scoping, suggestions were made that would create access into existing habitat, such as the construction of a boardwalk into existing willow riparian woodland along the east arm. This alternative was rejected because the existing habitat areas along the north and east arms are small and surrounded by high levels of visitor use. Further fragmentation could have a significant impact on the habitat value of these areas. Therefore all new visitor access improvements are proposed for currently disturbed areas that would be revegetated as a part of the Plan.

3.4.4 Dredging of Former North and East Arms

Both the north and east arms were open water prior to sedimentation. Today both the north and east arms are the least disturbed parts of the lake with the highest habitat values and the greatest diversity of emergent vegetation. It was determined that dredging these arms to create open water would make a negligible improvement to water quality but would destroy species-rich emergent wetlands in the process. Therefore dredging of the north and east arms was rejected as an alternative.

3.4.5 No Dredging of Mountain Lake

During public scoping, the idea of addressing water quality problems in Mountain Lake without dredging was raised. Specifically the idea of using only aeration as a means for enhancing water quality in Mountain Lake was put forward. This alternative was rejected because the abundance of nutrient-rich sediment currently found in Mountain Lake would make it difficult to eliminate algae blooms solely through aeration. Additionally, the benefits associated with deepening the lake, such as preventing the rapid filling of the lake with emergent vegetation, increasing thermal stratification, and increasing the volume of water in the lake, would not be achieved. For these reasons, a no-dredging alternative was rejected.

3.4.6 Deeper Dredging of Mountain Lake

During the public scoping process, an alternative restoring Mountain Lake to its original depth of 30-feet was proposed. This alternative was considered but rejected as being inconsistent with the objectives of this project and difficult to achieve. The objective of this project (Section 1.1.4) is to improve water quality in Mountain Lake, and not to restore Mountain Lake to some original condition. Mountain Lake has shrunk by 40 percent, and is seriously impinged by urban uses on all sides that preclude a full restoration of its original condition. Concerns about slope stability in adjacent upland areas and the potential for "punching through" the bottom of the lake suggest that full dredging might endanger the lake itself and/or adjacent land uses (Horne, 2000). As a result, the

Mountain Lake Enhancement Plan focuses on dredging an average of between 2 and 5 feet of material from the lake. This is deep enough to address project objectives, but not so deep to raise slope stability concerns. Deeper dredging alternatives have been rejected.

3.4.7 Leaving All Existing Eucalyptus Trees Along the East Shore

During public scoping, some participants expressed a desire to keep all of the eucalyptus trees along the east shore of Mountain Lake. Leaf litter and other debris from the eucalyptus contribute to the lake's poor water quality and prevent most native species from growing underneath them. The species found along the east shore *(E. globulus)* is invasive, fast-growing, tall, and water-consuming, making it highly efficient at invading and outcompeting existing riparian woodland and wetland habitats. Leaving the entire grove of eucalyptus along the east shore permanently would not only contribute to ongoing water quality problems in Mountain Lake, but it would probably spread into existing habitat. Therefore, this concept was not included in the Alternatives.

3.5 PERMITS AND APPROVALS REQUIRED TO IMPLEMENT THE PLAN

A description of the regulatory framework associated with the Mountain Lake Enhancement Plan is included in Section 2, Affected Environment. The Presidio Trust initiated early agency consultation during the scoping period and determined that the following environmental permits and approvals would be required to implement the Proposed Action. It is possible that additional permits and certifications would be required once the Mountain Lake Enhancement Plan Proposed Action is finalized. A more complete discussion of the scoping and interagency consultation process is included in Section 5, Consultation and Coordination.

3.5.1 National Environmental Policy Act

After circulation and public review of the EA, the Presidio Trust would consider and respond to any written or oral comments, either through the use of errata sheets, or text changes and rewrites in addition to, or in place of, errata sheets. The combination of the EA and the errata sheets would form the complete and final EA on which a Finding of No Significant Impact (FONSI) or decision to prepare an EIS would be based.

3.5.2 National Historic Preservation Act

Section 106 of the National Historic Preservation Act requires the Presidio Trust and the National Park Service to address potential effects on properties contributing to the Presidio National Historic Landmark District. Section 106 compliance would occur under the Presidio Programmatic Agreement between the National Park Service, the California State Historic Preservation Officer, and the Advisory Council on Historic Preservation.

3.5.3 Clean Water Act

Some aspects of the Proposed Action may require a permit or certification from the U.S. Army Corps of Engineers (USCOE) to comply with Section 404 of the Clean Water Act. Initial consultation with the USCOE during the project's scoping period indicated that Section 404 permits would not be required. Ongoing consultation with USCOE through the project's construction phase would occur.

3.5.4 State Porter-Cologne Water Quality Control Act

A National Pollutant Discharge Elimination System (NPDES) permit from the San Francisco Regional Water Quality Control Board (RWQCB) and compliance with Section 401 of the federal Clean Water Act would be required to address potential sources of surface water discharge during construction.

3.5.5 Endangered Species Act

Potential impacts to endangered and other special-status species are assessed in this document. Federal agencies, such as the Presidio Trust, are required to consult with the U.S. Fish and Wildlife Service (USFWS) to ensure their actions do not jeopardize the continued existence of any species listed as endangered or threatened under the 1973 Endangered Species Act. Consultation with the USFWS was initiated during the scoping phase and will continue to ensure that the Proposed Action is in compliance with this law.

4. Environmental Consequences

In this section the impacts listed below are analyzed.

- land uses
- slope stability
- water resources
- biological resources
- cultural resources
- recreation
- transportation
- air quality
- noise
- human health, safety, and the environment
- visitor access and other services
- scenic resources
- cumulative

A summary of environmental consequences is presented in Table 2. The results of the analysis conclude that none of the Action Alternatives would result in significant adverse environmental effects.

Overall, the Proposed Action (Alternative 2) would achieve the greatest balance of environmental benefits. The Proposed Action would result in beneficial impacts on water quality through lake deepening, exotic tree removal, and revegetation. Beneficial impacts on habitat quality in the Project Area would result from the enhancement of native plant communities. Under the Proposed Action, potential short-term impacts on scenic resources would be minimized by initially retaining several of the largest eucalyptus trees east of Mountain Lake and all trees east of the culvert. Under the Proposed Action, the removal of these trees would take place during a future phase, after the establishment of native tree cover along the east shore of Mountain Lake.

TABLE 2: SUMMARY OF IMPACTS

ALTERNATIVE 2 (PROPOSED ACTION)	ALTERNATIVE 1	ALTERNATIVE 3	NO ACTION
LAND USE IMPACTS			
Most consistent with NPS Management Policies and other plans: beneficial	Less consistent with NPS and other land use policies: beneficial	Consistent with NPS and other; land use Policies and other plans: beneficial	Not consistent with NPS and other land use policies: less than significant
WATER RESOURCES IMPACTS			
Erosion Related Water Quality Impacts			
Less than significant if mitigation steps implemented	Less than significant if mitigation steps implemented	Less than significant if mitigation steps implemented	No construction, not applicable
Potential Water Quality Impacts Associated with Dredging/Native Plant Community Enhancement			
Beneficial impacts	Beneficial impacts	Beneficial impacts	No change from current conditions
Water Quality Impacts on Contaminants and Water Temperature			
Insignificant	Insignificant	Insignificant	Not applicable
Effect on Surface Water Flow and Groundwater Recharge			
Insignificant	Not applicable	Insignificant	Not applicable
Water Quality Impacts and Potential Impacts on Federally Protected Wetlands			
Less than significant if mitigation steps implemented	Less than significant if mitigation steps implemented	Less than significant if mitigation steps implemented	Not applicable
BIOLOGICAL IMPACTS			
Temporary Impacts on Wildlife due to Tree Removal, Exotic Weed Removal, and Construction Activities			
Short term construction impacts minor; long term beneficial impacts if mitigation steps implemented	Short term construction impacts minor; Long term impacts beneficial if mitigation steps implemented	Short term construction impacts minor; Long term impacts most beneficial if mitigation steps implemented	Not applicable

TABLE 2: SUMMARY OF IMPACTS

ALTERNATIVE 2 (PROPOSED ACTION)	ALTERNATIVE 1	ALTERNATIVE 3	NO ACTION
Temporary and Long-Term Impacts on Native Vegetation			
Temporary construction impacts less than significant if mitigation steps implemented	Temporary construction impacts less than significant if mitigation steps implemented	Temporary construction impacts less than significant if mitigation steps implemented	No change from current conditions
Long term impacts: Beneficial	Long term impacts: Beneficial	Long term impacts: Beneficial	No change from current conditions
Long-Term Beneficial Impacts to Wildlife from Native Plant Community Enhancement			
Significant beneficial Impacts for phase one activities. Additional beneficial impacts from future phase activities	Significant beneficial Impacts for phase one activities.	Significant beneficial Impacts. Additional beneficial impacts from future phase activities	No change from current conditions
Wetlands Impacts due to Exotic Tree and Weed Removal			
Minor if mitigation steps implemented	Minor if mitigation steps implemented	Minor if mitigation steps implemented	No impacts
Long Term Wetlands Impacts			
Beneficial impacts	Beneficial impacts	Beneficial impacts	No change from current conditions
Potential Land-Use Conflicts between Visitor-Use Areas and Natural Habitat			
Insignificant if mitigation steps implemented	Insignificant if mitigation steps implemented	Insignificant if mitigation steps implemented	No change from current conditions
Beneficial Impacts of Future Adaptive Management Efforts			
Significant beneficial impacts anticipated	Significant beneficial impacts anticipated	Significant beneficial impacts anticipated	No change from current conditions
Slope Stability			
Potential impacts on slope stability are considered minor if mitigation steps are taken	Potential impacts on slope stability are considered minor if mitigation steps are taken	Potential impacts on slope stability are considered minor if mitigation steps are taken	No impacts

TABLE 2: SUMMARY OF IMPACTS

ALTERNATIVE 2 (PROPOSED ACTION)	ALTERNATIVE 1	ALTERNATIVE 3	NO ACTION
CULTURAL RESOURCES			
Beneficial Impacts			
Significant beneficial impacts to existing cultural resources	Significant beneficial impacts to existing cultural resources	Significant beneficial impacts to existing cultural resources	Significant beneficial impacts to existing cultural resources
Impacts to Historic Pumphouse Number 316			
No impacts anticipated	No impacts anticipated	No impacts anticipated	No impacts anticipated
Impacts to Unknown Cultural Resources			
Insignificant if mitigation steps implemented	Insignificant if mitigation steps implemented	Insignificant if mitigation steps implemented	No change from current conditions
RECREATION			
Temporary Adverse Impacts to Visitor Services due to Dredging Activity and Trail Improvements			
Insignificant if mitigation steps implemented	Insignificant if mitigation steps implemented	Insignificant if mitigation steps implemented	Not applicable
Beneficial Impacts of Construction on Visitor Facility Improvements			
Improvements of visitor facilities: beneficial	Improvements of visitor facilities: beneficial	Improvements of visitor facilities: beneficial	No change from current conditions
TRANSPORTATION			
No impacts anticipated	No impacts anticipated	No impacts anticipated	No impacts anticipated
AIR QUALITY			
Increased Dust and Emissions from Construction			
Insignificant if mitigation steps implemented	Insignificant if mitigation steps implemented	Insignificant if mitigation steps implemented	Not applicable
Temporary Increase in Particulate Emissions due to Construction Activity			
Insignificant if mitigation steps implemented	Insignificant if mitigation steps implemented	Insignificant if mitigation steps implemented	Not applicable

TABLE 2: SUMMARY OF IMPACTS

ALTERNATIVE 2 (PROPOSED ACTION)	ALTERNATIVE 1	ALTERNATIVE 3	NO ACTION
Air pollution from Ongoing Operations			
Less than significant	Less than significant	Less than significant	No change from current conditions
NOISE			
Temporary Noise Impacts during Construction			
Minor if mitigation steps implemented	Minor if mitigation steps implemented	Minor if mitigation steps implemented	Not applicable
Noise Impacts from Ongoing Operations			
Less than significant	Less than significant	Less than significant	Less than significant
HUMAN HEALTH, SAFETY AND THE ENVIRONMENT			
Construction-Related Hazards			
Less than significant	Less than significant Fire hazards	Less than significant	Not applicable
Less than significant; beneficial impacts after project completion	Less than significant; beneficial impacts after project completion	Less than significant; beneficial impacts after project completion	No change from current conditions
SCENIC RESOURCES			
Temporary Adverse Impacts			
Minor if mitigation steps implemented	Minor if mitigation steps implemented	Minor if mitigation steps implemented	Not applicable
Enhancement of Scenic Views			
Beneficial	Beneficial	Beneficial	Beneficial
Cumulative Impacts			
Minor if mitigation steps implemented	Minor if mitigation steps implemented	Minor if mitigation steps implemented	Minor if mitigation steps implemented

Alternative 1 (Figure 6) is anticipated to have fewer beneficial impacts on water quality due the removal of less nutrient-laden sediment and a shallower final profile. Water quality and habitat improvements under Alternative 1 are also not as beneficial because of the permanent retention of some exotic tree stands along the eastern part of the Project Area. Leaving some eucalyptus along the east shore would necessitate ongoing vigilance against its spread into adjacent habitats and the continuing fall of leaves and debris into the lake. Because fewer exotic trees and weeds are removed under this Alternative, there are fewer opportunities for native habitat enhancement. As a result, beneficial impacts associated with native plant community enhancement are more limited under this Alternative. Visitor access improvements are proposed only for south shore, meaning that existing un-designated access along the east shore would continue. Short-term visitor access impacts associated with construction activity would be minimal relative to Alternatives 2 and 3, because of the smaller scope of Alternative 1.

Alternative 3 (Figure 8) would result in beneficial long-term impacts on water quality and wildlife habitat similar to those described in the Proposed Action. Water quality improvements associated with lake deepening would be more beneficial than under the Proposed Action. Native plant community enhancements would be similar to the Proposed Action. Visitor access improvements would also occur in areas to the south and east of Mountain Lake, much like the Proposed Action. However, initial impacts on scenic resources would be adverse, as full tree removal along the east shore (1.65 acres) and east of the culvert (2.05 acres) is proposed for phase one.

Overall, adverse effects associated with elements of Alternative 1, 2, and 3 are anticipated to be less than significant and temporary, occurring during construction. Impacts would generally be mitigated by actions that would be implemented as part of the Alternatives. For example, under Alternatives 1, 2, and 3, the temporary disturbance of existing wetland vegetation would be mitigated by exotic plant removal and revegetation with native plant communities. The remaining ongoing impacts can be reduced to less than significant levels through institutional controls and modifications to project operations.

4.1 LAND USE IMPACTS

Changes in existing land use are not anticipated for the Project Area. Project implementation is not anticipated to result in significant land use conflicts or inconsistencies with relevant plans and policies. No impacts are anticipated.

4.1.1 ALTERNATIVE 1 - LAND USE IMPACTS

4.1.1.1 Consistency with Presidio Trust Act and General Objectives of GMPA

Alternative 1 includes dredging, enhancement of native freshwater wetlands, riparian, and woodland habitats; the creation of an interpretative site near historic pump #316; and the provision of trails and

overlooks for visitors. These actions comply with the Presidio Trust Act and General Objectives of the GMPA by restoring native plant communities in wetland, riparian, and woodland habitats in the Project Area (Presidio Trust Act; NPS, 1998) and providing an increased opportunity for recreation and interpretation. This Alternative is also consistent with the Presidio GMPA (NPS, 1994), which provides general guidelines for protecting and enhancing water quality in Mountain Lake.

Alternative 1 is generally consistent with the VMP (NPS, 1998). As defined in the VMP, Mountain Lake is located within the Presidio's Native Plant Management Zone. This document advocates protection and enhancement of wildlife habitat by expanding habitat for native plants, increasing diversity of habitats and native species, and avoiding construction-related disturbance to wildlife habitat at critical times in the year. This Alternative supports VMP objectives for restoring native plant communities by reclaiming habitat from past development and areas with non-native species (NPS, 1998). This Alternative is consistent with relevant land use policies. No negative impacts on existing land use policies and guidelines are anticipated.

4.1.1.2 Consistency with Relevant Land Use Policies

Alternative 1 is consistent with the objectives of the San Francisco Master Plan, which emphasizes the protection and maintenance of aquatic ecosystems, the managed use of natural resources, and the control of activities that can adversely affect aquatic systems (City and County of San Francisco, 1988). Because Alternative 1 is consistent with relevant local and regional plans, no impacts are anticipated.

4.1.2 Alternative 2 (Proposed Action) - Land Use Impacts

Alternative 2 is consistent with Trust, NPS, and other relevant land use policies summarized in 4.1.1. Therefore no impacts are anticipated.

4.1.3 Alternative 3 - Land Use Impacts

Alternative 3 is consistent with Trust, NPS, and other relevant land use policies summarized in 4.1.1. Therefore no impacts are anticipated.

4.1.4 No Action Alternative - Land Use Impacts

The No Action Alternative is not consistent with Trust, NPS, and other relevant land use policies and guidelines summarized in 4.1.1.

4.2 SLOPE STABILITY

4.2.1 Alternative 1 - Impacts to Slope Stability

Dredging activity and soil placement in the Project Area could affect slope stability, with potential impacts within the lake and on adjacent upland areas. However, the dredging design for Alternative 1

includes a buffer to protect shoreline slope stability around the lake's edge where no dredging would occur (Figure 6). Removal of exotic trees and weeds could result in temporary impacts to slope stability. Best management practices that are incorporated into tree and weed removal under Alternative 1 should minimize impacts to soil stability. As a result, no impacts are expected.

4.2.2 Alternative 2 (Proposed Action) - Impacts to Slope Stability

The impacts summarized in Section 4.2.1 apply to Alternative 2.

4.2.3 Alternative 3 - Impacts to Slope Stability

Alternative 3 may have a slightly larger impact on slope stability within the lake than Alternatives 1 and 2, due to the removal of the top foot of sediment from non-sandy areas within the buffer area. This removal could affect slope stability along the lake edge. Otherwise, the impacts summarized in 4.2.1 apply to Alternative 3.

4.2.4 No Action Alternative - Impacts to Slope Stability

No impacts on slope stability would result from the No Action Alternative.

4.3 WATER RESOURCES

Potential impacts of each Alternative (including the No Action Alternative) on surface water quality and hydrology are discussed in the following sections.

4.3.1 Alternative 1 - Water Resources Impacts

4.3.1.1 Temporary Erosion Related Water Quality Impacts

Temporary Impacts Due To Exotic Plant Removal. Alternative 1 includes removal of exotic trees and weeds within the Project Area (Figure 6) scheduled for a period between late summer and fall of 2001 that may temporarily increase soil erosion (1.36 acres of exotic trees and 2 acres of weeds). Because appropriate erosion control measures will be taken following exotic plant removal, this impact is not considered significant.

Temporary Impacts Due To Dredging. Dredging would temporarily increase turbidity within Mountain Lake. Temporary shoreline disturbance and erosion could occur at the staging area due to dredging activities resulting in minor disturbance to the shoreline and desirable vegetation. These short-term impacts are not considered significant.

Temporary Impacts Due to Construction Activities. Temporary erosion impacts could result from construction activities such as sediment placement in the Project Area and trail construction along the south shore. The employment of best management practices during construction should minimize potential impacts. These short-term impacts are not considered significant.

4.3.1.2 Long Term Impacts On Current Levels Of Erosion

Beneficial Impacts of Native Plant Community Enhancement. Native plant revegetation is anticipated to decrease current erosion associated with exposed soils on the east side of Mountain Lake (Poore and Fries, 1985). Long-term beneficial impacts would result from the planting of appropriate native plant communities in wetland, riparian, and woodland zones within the tree removal area.

Impacts Due to Unmanaged Trail Use. Some soil erosion due to unmanaged trail use would continue.

4.3.1.3 Water Quality Impacts on Contaminants and Water Temperature

Potential Contaminant Impacts Due to Dredged Sediment Placement. Temporary storage of approximately 5000 cubic yards of dredged sediment may take place at the Presidio, and approximately 1,000 cubic yards of suitable fill may be reused to recontour the former tank area. Appropriate handling and reuse of dredged sediment through employing best management practices would minimize the discharge of contaminants into the lake's surface water or leaching of contaminants into groundwater at the reuse or disposal sites.

Potential Contaminant Discharge During Construction Activities. Contaminant discharge during construction could occur under Alternative 1. Short-term impacts could result from discharge of construction-related materials (fuels, lubricants, solvents, and cleaners). The employment of best management practices during construction would reduce the potential for this impact.

Potential Traffic Related Impacts on Surface Water Quality. No increases in traffic are anticipated for parking areas occurring in the vicinity of the Project Area. Traffic-related impacts on surface water quality are considered insignificant. Long-term impacts of traffic-related pollutants in the Project Area would not change from current conditions.

Beneficial Impacts of Eucalyptus Removal on Water Quality. Eucalyptus removal proposed under Alternative 1 would reduce nutrients in lake water, reduce the leaching of chemicals such as phenolics that are associated with eucalyptus vegetative matter (Moral and Muller 1969; Laws, pers. comm.), and decrease water discoloration associated with eucalyptus leaves (Horne, 2000). These are considered beneficial impacts.

Beneficial Impacts of Sediment Removal on Water Quality. Under Alternative 1, nutrient-rich sediment is dredged from the lake bottom. This action would reduce nutrients available in lake bottom sediments, increase the volume of water in the lake, dilute any remaining nutrients, and reduce the frequency of algae blooms (Horne, 2000). This is considered beneficial.

4.3.1.4 Impacts of Native Plants on Nutrient Levels

The establishment of native wetland and emergent vegetation along the margins of Mountain Lake may increase the efficiency of nutrient uptake from non-point sources of nutrient enrichment within the Mountain Lake watershed (Cannon, 2000). This is considered a beneficial impact.

4.3.1.5 Impacts on Surface Water Flow

No beneficial or adverse impacts on surface water flow would result from Alternative 1.

4.3.1.6 Potential Effect on Groundwater Recharge

Available information indicates that Mountain Lake is probably groundwater-fed (Horne, 2000). Dredging could affect lake levels if underlying impervious sediments are removed (Horne, 2000). However, during the construction of Park Presidio Boulevard, approximately 10 to 20 feet of fill material was deposited in the lake. A maximum of two feet of lake sediment would be removed under this Alternative. Therefore it is unlikely that sediment removal would impact groundwater recharge.

4.3.2 Alternative 2 (Proposed Action) - Water Resources Impacts

4.3.2.1 Temporary Erosion Related Water Quality Impacts

The impacts summarized in Section 4.3.1.1 apply to Alternative 2. Additional temporary impacts are anticipated from east shore trail construction, future construction activities, and future tree removal activities (an additional 3.29 acres of trees and 4.3 acres of exotic weeds). The employment of best management practices during construction would reduce the potential for this impact.

4.3.2.2 Long Term Impacts On Current Levels of Erosion

Beneficial Impacts of Native Plant Community Enhancement. Native plant community enhancement would decrease current erosion associated with exposed soils to the east of Mountain Lake, as described in Section 4.2.1.2. Long-term beneficial impacts would be greater under Alternative 2 than under Alternative 1, due to the higher acreage of exotic trees replaced with native plants. Additional native plant enhancement would result in greater beneficial impacts under Alternative 2.

Impacts Due to Managed Trail Use. Alternative 2 is anticipated to have a beneficial impact on soil erosion by reducing unmanaged use of the east shore by building a trail through the area.

4.3.2.3 Water Quality Impacts on Contaminants and Water Temperature

The impacts summarized in Section 4.3.1.3 apply to phase one and future phases of Alternative 2. Additional temporary impacts include east shore trail construction, more extensive dredging (11,500 cy), and future phase activities. Beneficial impacts of eucalyptus removal on water quality and beneficial impacts of dredging are similar to those described in Section 4.3.1.3. Additional beneficial impacts on water quality, including a reduction in the likelihood of algae blooms, would result from

the dredging of more sediment from the lake under Alternative 2. Additional long-term benefits would result from future phase tree removals.

4.3.2.4 Impacts of Native Plants on Nutrient Levels

Beneficial impacts of native plant community enhancement are similar to those described in Section 4.3.1.4. Additional long-term benefits would result from future native plant community enhancement.

4.3.2.5 Impacts on Surface Water Flow

The jurisdictional wetland to the east of the east arm culvert is hydrologically connected to Mountain Lake. Future phase replacement of the east arm culvert with a bridge and restoration of wetlands beyond the east arm culvert would have the beneficial effect of improving surface water flow to Mountain Lake.

4.3.2.6 Potential Effect on Groundwater Recharge

Impacts on groundwater recharge are similar to those described in Section 4.3.1.6. No impacts are anticipated.

4.3.3 Alternative 3 - Water Resources Impacts

4.3.3.1 Temporary Erosion Related Water Quality Impacts

The impacts summarized in Section 4.3.1.1 apply to Alternative 3. This Alternative would result in temporary erosion impacts due to removal of the exotic trees and weeds in the first phase (3.7 acres of trees and 4.5 acres of weeds). Additional temporary impacts are anticipated from east shore trail construction, future construction activities, and future phase tree removals. These impacts are not considered significant.

4.3.3.2 Long Term Impacts on Current Levels of Erosion

Beneficial Impacts of Native Plant Community Enhancement. Native plant community enhancement would decrease current erosion associated with exposed soils to the east of Mountain Lake, as described in Section 4.3.2.2. Additional native plantings under Alternative 3 would result in beneficial impacts.

Impacts Due to Managed Trail Use. Alternative 3 is anticipated to have a beneficial impact on soil erosion by reducing unmanaged use of east shore though the construction of a new trail.

4.3.3.3 Water Quality Impacts on Contaminants and Water Temperature

The impacts summarized in Section 4.3.1.3 apply to Alternative 3. Additional temporary impacts are anticipated due to east shore trail construction, more extensive dredging (14,300 cy), and future phase tree removals. Beneficial impacts of eucalyptus removal on water quality and beneficial impacts of dredging are similar to those described in Section 4.3.1.3. Additional beneficial impacts on water

quality, including a reduction in the likelihood of algae blooms, would result from the dredging of more sediment from the lake under Alternative 3. Additional long-term benefits would result from future phase tree removals.

4.3.3.4 Impacts of Native Plants on Nutrient Levels

Beneficial impacts of eucalyptus removal on water quality are similar to those described in Section 4.3.1.4. Additional long-term benefits would result from future native plant community enhancements.

4.3.3.5 Impacts on Surface Water Flow

The jurisdictional wetland to the east of the east arm culvert is hydrologically connected to Mountain Lake. Replacement of the east arm culvert with a bridge and restoration of wetlands to the east of the culvert would have a beneficial impact on surface water flow to Mountain Lake.

4.3.3.6 Potential Effect on Groundwater Recharge

Impacts on groundwater recharge are similar to those described in Section 4.3.1.6. No impacts are anticipated.

4.3.4 No Action Alternative

4.3.4.1 Temporary Erosion Related Water Quality Impacts

No temporary erosion related water quality impacts would occur.

4.3.4.2 Long Term Impacts On Current Levels Of Erosion

No beneficial impacts on current levels of erosion would occur. Erosion impacts associated with unmanaged trail use would continue.

4.3.4.3 Water Quality Impacts on Contaminants and Water Temperature

No temporary construction related contaminant impacts would occur. Existing water quality impacts of eucalyptus trees and existing lake temperature problems would continue. Shallowness of lake would allow emergent vegetation to rapidly fill lake.

4.3.4.4 Impacts of Native Plants on Nutrient Levels

No beneficial impacts of native plant community enhancements would occur.

4.3.4.5 Impacts on Surface Water Flow

No beneficial impacts of improved surface water flow would occur.

4.3.4.6 Potential Effect on Groundwater Recharge

No impacts on groundwater recharge would occur.

4.4 BIOLOGICAL RESOURCES

4.4.1 ALTERNATIVE 1 - IMPACTS TO BIOLOGICAL RESOURCES

4.4.1.1 Temporary Impacts to Wildlife Due to Tree and Weed Removal

Alternative 1 includes the removal of 1.36 acres of exotic trees and 2 acres of weeds within the Project Area (Figure 6). These activities would temporarily affect wildlife, including special status species known to occur within the Project Area. Nearby native habitats within the Project Area would be protected during these activities, and could provide alternative habitat and/or refugia for wildlife during tree and weed removal activities. These temporary impacts are not considered significant.

4.4.1.2 Temporary Impacts to Wildlife Due to Construction Activities

Proposed construction activity such as dredging, sediment removal, and overlook construction could result in minor temporary disturbance to birds, fish, and other wildlife known to occur within the Project Area. Nearby native habitats within the Project Area would be protected during these activities, and can provide alternative habitat and/or refugia for wildlife during tree and weed removal activities. These temporary impacts are not considered significant.

4.4.1.3 Long-term Beneficial Impacts from Native Plant Enhancement

Dredging, exotic plant removal, and revegetation proposed in Alternative 1 would result in long-term beneficial impacts to wildlife.

The restoration of native plant communities would enhance habitat for birds and wildlife, with benefits increasing over time as habitat complexity and quality increase. Although eucalyptus does provide some habitat value for birds (e.g., nesting and roosting habitat for raptors), the riparian woodland and native woodland that would replace the eucalyptus have higher habitat value and are more restricted at the Presidio. Exotic weed removal is anticipated to reduce nuisance pests such as rats, which are known to prey on the eggs and fledglings of ground nesting birds such as orange-crowned warblers (*Vermivora celata*) and dark-eyed juncos. In addition, ground nesting birds are known to be more threatened with predation by Stellar's jays (*Cyanocitta stelleri*) in a relatively uniform, homogeneous habitat containing weeds (Clark, 2000).

4.4.1.4 Temporary Impacts on Native Vegetation

Exotic plant removal and revegetation may have temporary impacts on desirable plants such as willows, which are found among the exotic species to be removed.

Exotic tree and weed removal is proposed within the Project Area (Figure 4). Many of these weeds, such as Boston ivy and Himalayan blackberry, occur in close association with arroyo willow in riparian areas. Impacts to existing riparian and upland habitats from exotic plant removal could be significant. However, these impacts would be temporary. Trimming of willows in transitional wetland

areas may be necessary to remove persistent weeds such as Cape ivy. Trimming of willows may also be required when the culvert at the east arm of Mountain Lake is replaced with a bridge.

Dredging activities may also have impacts on existing wetlands. Potential impacts on wetlands depend upon the type of dredging methods employed. Temporary impacts to wetlands are likely to be minor if clamshell dredging is used.

4.4.1.5 Impacts on Native Plant Communities

Alternative 1 would include the restoration of 1.36 acres of habitat in the exotic tree removal area and 2 acres of native plant community habitat in the exotic weed removal area. Three native plant community zones would be reestablished adjacent to the lake: wetland, riparian, and oak woodland zones. Project benefits include diversification of native plant communities through the reintroduction of many species that previously occurred at the Project Area. The addition of native trees such as red alder, holly-leaf cherry, wax myrtle, oak, and willow to the western edge of the Project Area is considered a beneficial impact. The removal of exotic weeds and revegetation of the area between the golf course and the Juan Bautista De Anza Historic Trail is also considered a beneficial impact. Wetland quality is anticipated to improve from native plant community enhancements.

4.4.1.6 Beneficial Impacts on Wetlands Due to Exotic Tree and Weed Removal

Removal of weeds is considered a project benefit, as weeds compromise the quality of wetlands habitat. Removal of exotic trees such as eucalyptus is considered a project benefit because of the resulting improvement to water quality within wetlands areas. Native wetland enhancement would increase species diversity in existing wetlands.

4.4.1.7 Potential Land-Use Conflicts between Visitor Use and Habitat

Existing conflicts between visitor use areas and natural habitat in uncontrolled access areas along the east shore of Mountain Lake would continue under Alternative 1. Uncontrolled access to the enhanced habitats could result in adverse impacts to wildlife and vegetation.

4.4.1.8 Impacts of Adaptive Management Actions

Adaptive management actions under Alternative 1 may involve removal of non-native carp from the lake. Project benefits of fish removal include an increase in smaller planktivorous fish and a decrease in nutrients in the lake, lowering the likelihood of algae blooms in Mountain Lake and increasing the potential for aquatic flora and fauna restoration. The only fish documented at Mountain Lake are exotic species. No special status aquatic biota has been documented. No adverse effects to native aquatic fauna are anticipated from this action.

4.4.2 Alternative 2 (Proposed Action) - Impacts to Biological Resources

4.4.2.1 Temporary Impacts to Wildlife Due to Tree and Weed Removal

The impacts summarized in Section 4.4.1.1 apply to Alternative 2. Additional temporary impacts are anticipated from future phase tree and weed removal activities (3.29 acres of trees and 4.3 acres of exotic weeds).

4.4.2.2 Temporary Impacts to Wildlife Due to Construction Activities

The impacts summarized in Section 4.4.1.2 apply to this alternative. Additional temporary impacts are anticipated from future phase construction activities.

4.4.2.3 Long-term Impacts from Native Plant Enhancement

The impacts summarized in Section 4.4.1.3 apply to Alternative 2. Additional beneficial impacts are anticipated from future native plant enhancement (3.29 acres of exotic tree removal and 4.3 acres of weed removal). Wetlands enhancement during future phases could result in the creation of additional shallow, open water habitat.

4.4.2.4 Temporary Impacts on Native Vegetation

The impacts summarized in Section 4.4.1.4 apply to Alternative 2. Additional temporary impacts are anticipated from future phase tree and weed removal activities.

4.4.2.5 Impacts on Native Plant Communities

The beneficial impacts summarized in Section 4.4.1.5 apply to Alternative 2. Additional beneficial impacts are anticipated from future native plant enhancement (3.29 acres of exotic tree removal and 4.3 acres of weed removal).

4.4.2.6 Beneficial Impacts on Wetlands Due to Exotic Tree and Weed Removal

The beneficial impacts summarized in Section 4.4.1.6 apply to Alternative 2. Additional beneficial impacts to wetlands (e.g., wetlands to the east of the culvert) are anticipated from future native plant enhancement.

4.4.2.7 Potential Land-Use Conflicts between Visitor Use and Habitat

Proposed trail construction makes provisions for safe visitor access that is likely to reduce impacts to habitat from "off-trail" visitor use along the east shore of Mountain Lake. By defining currently uncontrolled access along the east shore, trail construction under Alternative 2 is expected to have a beneficial impact on the visitor experience and on wildlife.

4.4.2.8 Impacts of Adaptive Management Actions

The impacts summarized in Section 4.4.1.8 apply to Alternative 2.

4.4.3 Alternative 3 - Impacts to Biological Resources

4.4.3.1 Temporary Impacts to Wildlife Due to Tree and Weed Removal

The impacts summarized in Section 4.4.1.1 apply to Alternative 3. Additional temporary impacts are anticipated during phase one (3.7 acres of trees and 4.5 acres of exotic weeds) and future phase tree and weed removal activities (0.75 acres of trees and 1.8 acres of exotic weeds).

4.4.3.2 Temporary Impacts to Wildlife Due to Construction Activities

The impacts summarized in Section 4.4.1.2 apply to Alternative 3. Additional temporary impacts are anticipated from more extensive first phase activities (culvert and tree removals) and future phase construction activities.

4.4.3.3 Long-term Impacts from Native Plant Enhancement

The impacts summarized in Section 4.4.1.3 apply to Alternative 3. Additional beneficial impacts are anticipated from more extensive native plant enhancement activities. Wetlands enhancement during future project phases could result in the creation of additional shallow, open water habitat.

4.4.3.4 Temporary Impacts on Native Vegetation

The impacts summarized in Section 4.4.1.4 apply to Alternative 3. Additional temporary impacts are anticipated from future phase tree and weed removal.

4.4.3.5 Impacts on Native Plant Communities

Impacts summarized in Section 4.4.1.5 apply to Alternative 3. Additional beneficial impacts are anticipated from more extensive first phase and future native plant enhancement.

4.4.3.6 BeneficIal Impacts on Wetlands Due to Exotic Tree and Weed Removal

The beneficial impacts summarized in Section 4.4.1.6 apply to Alternative 3.

4.4.3.7 Potential Land-Use Conflicts between Visitor Use and Habitat

The impacts summarized in Section 4.4.2.7 apply to Alternative 3.

4.4.3.8 Impacts of Adaptive Management Actions

The impacts summarized in Section 4.4.1.8 apply Alternative 3.

4.4.4 No Action Alternative - Impacts to Biological Resources

4.4.4.1 Temporary Impacts to Wildlife Due to Tree and Weed Removal Activities

No temporary impacts to wildlife would occur under the No Action Alternative.

4.4.4.2 Temporary Impacts to Wildlife Due to Construction Activities

No temporary impacts to wildlife would occur under the No Action Alternative.

4.4.4.3 Long-term Impacts from Native Plant Enhancement

No beneficial impacts to wildlife would occur under the No Action Alternative.

4.4.4.4 Temporary Impacts on Native Vegetation

No temporary impacts to native vegetation would occur.

4.4.4.5 Impacts on Native Plant Communities

No beneficial impacts to native plant communities would occur.

4.4.4.6 Beneficial Impacts on Wetlands Due to Exotic Tree and Weed Removal

No beneficial impacts to wetlands would occur.

4.4.4.7 Potential Land-Use Conflicts between Visitor Use and Habitat

The impacts summarized in all sections of 4.4.1.7 would continue to apply under the No Action Alternative.

4.4.4.8 Impacts of Adaptive Management Actions

No beneficial impacts from future adaptive management efforts would occur.

4.5 CULTURAL RESOURCE IMPACTS

4.5.1 ALTERNATIVE 1 - IMPACTS TO CULTURAL RESOURCES

4.5.1.1 Impacts to Mountain Lake and Historic Pump #316

Alternative 1 includes measures to enhance the viability of Mountain Lake but would have no adverse effect on the qualities that qualify it as a Landmark. Alternative 1 also includes the stabilization of historic pump #316 and the non-historic structure within which it is located. These actions are considered beneficial.

4.5.1.2 Potential Impacts to Unknown Cultural Resources

Potential Dredging Impacts to Unknown Cultural Resources. It is possible that additional historic structures and/or objects are present within sediment at Mountain Lake and could be impacted by project activities. Proposed dredging activities would not occur in areas that were historically upland, but only within the former lake bed, minimizing potential impacts to unknown cultural resources within the sediment. The preparation of an Archeological Management Assessment and Monitoring Program, which would include an inventory of known and/or potential archeological sites at Mountain Lake and may include test excavations, prior to enhancement activities would minimize construction related impacts to cultural resources hidden in the sediment. During dredging, professional archeological monitoring would ensure than any unanticipated, post-review discoveries are treated appropriately.

Potential Construction Related Impacts to Cultural Resources. Other than Mountain Lake and pump #316, there are no known cultural resources of significance or potential significance where construction related activity would take place within the Project Area. It is possible that additional hidden historic sites and/or objects present in the Project Area could be impacted by project activities such as weed removal, tree removal and revegetation. The preparation of an Archeological Management Assessment and Monitoring Program, which would include an inventory of known and/or potential archeological sites at Mountain Lake and may include test excavations, prior to enhancement activities would minimize construction related impacts to hidden cultural resources. During the construction phases of the project, professional archeological monitoring would ensure than any unanticipated, post-review discoveries are treated appropriately. If any archeological or other historic resources are unexpectedly discovered during the construction process, the State Historic Preservation Office and the Advisory Council on Historic Preservation would be notified and the protocols outlined in 36 CFR Part 800.13 "Post Discoveries" would be followed. This should minimize the impacts of construction on potential cultural resources.

4.5.2 Alternative 2 (Proposed Action) - Impacts to Cultural Resources

4.5.2.1 Impacts to Mountain Lake and Historic Pump #316

The impacts summarized in Section 4.5.1.1 apply to Alternative 2. Beneficial impacts would result from enhancement activities (overlooks, interpretation area, trails, and native vegetation enhancement) around pump #316.

4.5.2.2 Potential Impacts to Unknown Cultural Resources

The impacts summarized in Section 4.5.1.2 apply to Alternative 2. Additional potential impacts to unknown cultural resources may occur during first phase trail and seating construction, as well as during future phase culvert removal, tree removal and bridge construction activities. These potential impacts would be mitigated by the actions described in Section 4.5.1.2.

4.5.3 Alternative 3 - Impacts to Cultural Resources

4.5.3.1 Impacts to Mountain Lake and Historic Pump No. 316

The impacts summarized in Section 4.5.1.1 apply to Alternative 3. Beneficial impacts would result from enhancement activities (overlooks, interpretation area, trails, and native vegetation enhancement) of the area around pump #316.

4.5.3.2 Potential Impacts to Unknown Cultural Resources

The impacts summarized in Section 4.5.1.2 apply to Alternative 3. Additional potential impacts to unknown cultural resources may occur during first phase trail construction, overlook construction,

culvert removal, tree removal, and bridge construction, as well as during future phase tree removal, weed removal, and revegetation activities. These potential impacts are mitigated by the actions described in Section 4.5.1.2.

4.5.4 No Action Alternative - Impacts to Cultural Resources

4.5.4.1 Impacts to Mountain Lake and Historic Pump #316

Beneficial impacts to Mountain Lake and historic pump #316 would not occur under the No Action Alternative.

4.5.4.2 Potential Impacts to Unknown Cultural Resources

No impacts to unknown cultural resources would result from the No Action Alternative.

4.6 RECREATION

4.6.1 Alternative 1 - Impacts to Recreation

4.6.1.1 Temporary Impacts Due to Dredging and Trail Improvements

Visitor access would be temporarily limited during project construction. Designated trail access within the Project Area is on West Pacific Avenue (part of the Juan Bautista De Anza Historic Trail), which runs parallel to the east shore of the lake to the underpass under Park Presidio Boulevard (Figure 2). The east side of Mountain Lake would be closed during construction.

Advance notice and signage proposing detours to the public will be provided so that as much of the Project Area as possible remains accessible. This temporary closure is less than significant. In the long-term, visitor access would be enhanced at Mountain Lake.

Enhancement areas would be fenced during the establishment of native plant communities. However, designated trails do not currently exist in this area. Therefore, this temporary closure is not considered significant.

4.6.1.2 Impacts of Making Visitor Facility Improvements

Under Alternative 1, visitor facility improvements include construction of the south shore overlook. This improvement is considered a beneficial effect because it improves the quality of visitor facilities at Mountain Lake and increases passive recreational opportunities such as bird watching.

4.6.2 Alternative 2 (Proposed Action) - Impacts to Recreation

4.6.2.1 Temporary Impacts Due to Dredging and Trail Improvements

The temporary impacts summarized in Section 4.6.1.1 apply to Alternative 2. Additional temporary impacts to visitor services would result from future construction.

4.6.2.2 Impacts of Making Visitor Facility Improvements

The beneficial impacts summarized in Section 4.6.1.2 apply to Alternative 2. More extensive visitor improvements, such as the east shore trail (300'), overlooks, and the bridge over the east arm would create additional beneficial impacts to visitor services under Alternative 2.

4.6.3 Alternative 3 - Impacts to Recreation

4.6.3.1 Temporary Impacts Due to Dredging and Trail Improvements

The temporary impacts summarized in Section 4.6.1.1 apply to Alternative 3. Additional temporary impacts to visitor services would result from the more extensive first phase and future construction activities included in Alternative 3.

4.6.3.2 Impacts of Making Visitor Facility Improvements

The beneficial impacts summarized in Section 4.6.1.2 apply to Alternative 3. More extensive first phase visitor improvements, such as the east shore trail, overlooks, and the bridge over the east arm, create additional beneficial impacts to visitor services under Alternative 3. This Alternative also includes a new trail at a length of 490'.

4.6.4 No Action Alternative - Impacts to Recreation

4.6.4.1 Temporary Impacts Due to Dredging and Trail Improvements

No adverse impacts would result from the No Action Alternative.

4.6.4.2 Impacts of Making Visitor Facility Improvements

No beneficial impacts would result from the No Action Alternative.

4.7 TRANSPORTATION

4.7.1 Alternative 1 - Impacts to Transportation

Improvements included in Alternative 1 are proposed to accommodate existing users of Mountain Lake and would not affect access and parking in the Project Area. Nonetheless, Alternative 1 may result in a minimal increase in overall traffic because of the increased attractiveness of the site.

4.7.2 Alternative 2 (Proposed Action) - Impacts to Transportation

The impacts summarized in Section 4.7.1 apply to Alternative 2.

4.7.3 Alternative 3 - Impacts to Transportation

The impacts summarized in Section 4.7.1 apply to Alternative 3.

4.7.4 No Action Alternative - Impacts to Transportation

No increases in automobile traffic are anticipated from the No Action Alternative.

4.8 AIR QUALITY

4.8.1 ALTERNATIVE 1 - IMPACTS TO AIR QUALITY

4.8.1.1 Temporary Dust Generated from Construction Activities

Construction activities and exotic tree removal proposed as part of Alternative 1 could temporarily generate dust by heavy machinery operation on unpaved surfaces, earthmoving and grading, and wind erosion of unpaved areas and uncovered stockpiles.

4.8.1.2 Temporary Increase in Particulate Emissions Due to Construction

Construction activities and exotic tree removal proposed as part of Alternative 1 could temporarily generate particulate matter and diesel fuel combustion products such as Ox, CO, and SO2.

4.8.1.3 Air Pollution Emissions from Ongoing Operations at Mountain Lake

Implementation of the Proposed Action would not significantly increase the amount of emissions. Traffic-related emissions and emissions from routine landscape maintenance are expected to be minor and similar to current levels. Because operation-related emissions under are not expected in increase over existing conditions this impact is considered less than significant.

4.8.2 ALTERNATIVE 2 (PROPOSED ACTION) - IMPACTS TO AIR QUALITY

The impacts summarized in Section 4.8.1 apply to Alternative 2. Similar impacts may occur during future phase construction activities.

4.8.3 ALTERNATIVE 3 - IMPACTS TO AIR QUALITY

The impacts summarized in Section 4.8.1 apply to Alternative 3. Temporary impacts may be slightly greater under this Alternative due to the broader scope of phase one activities. Similar impacts may occur during future phase construction activities.

4.8.4 NO ACTION ALTERNATIVE - IMPACTS TO AIR QUALITY

No impacts to air quality would result from the No Action Alternative.

4.9 NOISE

4.9.1 ALTERNATIVE 1 - NOISE IMPACTS

4.9.1.1 Noise Increase during Construction and Tree Removal

Construction and tree removal could be noticeable and annoying to nearby residents and visitors to Mountain Lake. Contractors and other equipment operators would be obliged to comply with provisions equivalent to the standards in the San Francisco Noise Ordinance. Because construction noise would be temporary and restricted in occurrence and level, the increase in noise in the project vicinity during project construction would not be considered a significant impact.

4.9.1.2 Potential Long-term Noise Increases from Ongoing Operations

Operation and maintenance would result in no or minimal increase in noise levels compared to current conditions. For example, trash collection may occur at a location along the east part of the Project Area in response to increased use of the area. Regular maintenance activities are not anticipated to increase on completion of the project construction phases.

4.9.2 Alternative 2 (Proposed Action) - Noise Impacts

The impacts summarized in Section 4.9.1 apply to Alternative 2.

4.9.3 Alternative 3 - Noise Impacts

The impacts summarized in Section 4.9.1 apply to Alternative 3.

4.9.4 No Action Alternative - Noise Impacts

No adverse noise impacts would occur from the No Action Alternative.

4.10 HUMAN HEALTH, SAFETY, AND THE ENVIRONMENT

4.10.1 Alternative 1 - Impacts to Health, Safety and the Environment

4.10.1.1 Construction-Related Hazards

Alternative 1 includes construction that could pose hazards to the public if uncontrolled access is permitted in the project construction areas during construction. However, because areas under construction would be fenced and closed to the public, this hazard is considered to be insignificant.

Remedial investigations have characterized waste in the Project Area. No hazardous levels of contamination occur within the Project Area (Dames and Moore, 1997). Analysis of lake sediment indicates that contaminants are present at levels that do not pose risks to human health under expected exposure scenarios.

4.10.1.2 Potential Fire Hazards

The climate of the Presidio is not conducive to wildfire because of its cool and humid conditions. Eucalyptus stands, because of their high natural loading of fuels and because of volatile compounds associated with eucalyptus bark, are considered a higher fire hazard than native plant communities (NPS, 1994). Although the risk of wildfire is low in the Presidio, tree removal in Alternative 1 could reduce potential fire hazard within the Project Area.

4.10.2 Alternative 2 (Proposed) - Impacts to Health, Safety and the Environment

The impacts summarized in Sections 4.10.1 and 4.10.2 apply to Alternative 2.

4.10.3 Alternative 3 - Impacts to Health, Safety and the Environment

The impacts summarized in Sections 4.10.1 and 4.10.2 apply to Alternative 3.

4.10.4 No Action Alternative - Impacts to Health, Safety and the Environment

No changes in current conditions are expected from the No Action Alternative.

4.11 SCENIC RESOURCES

4.11.1 Alternative 1 - Impacts to Scenic Resources

4.11.1.1 Temporary Adverse Impacts on Scenic Resources

Initial adverse effects on visitor scenic resources are anticipated during dredging and other construction activities. Exotic tree and weed removal proposed under Alternatives 1 would result in temporary adverse impacts to visual resources. Eucalyptus removal along the east shore would have a temporary adverse impact on scenic resources at the lake, by exposing bare slopes. The permanent retention of four large eucalyptus trees (roughly 20% of the canopy) along the east shore would mitigate some of the visual impacts of tree removals along the east shore. Tree and weed removal sites would temporarily appear to be bare during the revegetation process. Native species planted should cover the tree removal sites within three to five years.

4.11.1.2 Long Term Benefits to Scenic Resources

Enhancement of the View from the South Shore. Removal of exotic trees and weeds, revegetation, and the creation of an interpretive overlook along the south shore are proposed under Alternative 1. These actions, as well as the enhancement of native plant communities over time, would improve scenic resources in the Project Area.

Tree removal would permanently change the appearance of the east shore, opening up views of the golf course and cypress trees beyond (Figure 10). Eucalyptus trees would be removed along the east shore, and shorter-stature species including yellow willow, red alder, big-leaf maples, coast live oak, and wax myrtle would be planted. Over three to five years, a more complex mosaic of wetland, riparian, and native woodland habitat would be visible in the foreground. For some, the removal of these eucalyptus would be considered a negative visual impact. For others, tree removal might be considered a beneficial visual impact, by opening up views into the Presidio Golf Course. The permanent retention of four, large eucalyptus trees (roughly 20% of the total existing canopy) along the de Anza Trail would mitigate the visual impact of tree removal along the east shore.

The view from the south shore looking west toward Highway 1 would also change under Alternative 1. Native tree planting amidst the existing trees along the western shore of Mountain Lake would be fully-grown in 25 to 30 years. These plantings would completely block views of passing cars and

trucks on Park Presidio Boulevard, as well as block much of the Presidio housing on the hill above (Figure 13). These enhancements are considered beneficial to scenic resources.

Enhancement of Views from the East Shore. Alternative 1 would open up views of the lake from the Juan Bautista De Anza Historic Trail and the east shore. The exotic weed removal and the enhancement of native plant communities (native wetland, riparian, and woodland species) would eliminate bare, eroded slopes along the east shore, improving overall scenic character within the Project Area.

4.11.2 Alternative 2 (Proposed Action) - Impacts to Scenic Resources

4.11.2.1 Temporary Adverse Impacts on Scenic Resources

The impacts summarized in Section 4.11.1.1 apply to Alternative 2. Eucalyptus removal along the east shore would have a temporary adverse impact on scenic resources at the lake. First phase retention of four large eucalyptus trees (roughly 20% of the canopy) would mitigate some of the visual impact of tree removals along the east shore. Under Alternative 2, these four trees would be removed during a future phase, creating an additional temporary adverse impact on scenic resources at the time of removal.

4.11.2.2 Long Term Benefits to Scenic Resources

Enhancement of Views from the South. The impacts summarized in Section 4.11.1.2 apply to Alternative 2. Future phase weed removal, exotic tree removal, culvert removal and bridge construction would create new viewpoints, eliminate more bare slopes, and create a more visually-complex mosaic of vegetation. Future phase eucalyptus removal along the east shore (Figure 11) would further open the Project Area to views of the golf course and cypress trees beyond. The visual impact of this future phase removal would be mitigated by growth of native woodland planted on the slopes below the tree removal area, which would create a pleasing visual buffer along the east shore (Figure 11).

Enhancement of Views from the East Shore. Alternative 2 would open up views of the lake from the Juan Bautista De Anza Historic Trail and the east shore. The construction of a trail and three overlooks along the east shore would create additional opportunities for visitors to enjoy the views. Future exotic weed removal and the enhancement of native plant communities (native wetland, riparian, and woodland species) would eliminate bare, eroded slopes along the east shore, improving scenic resources within the Project Area. Future phase culvert removal and bridge construction would increase visual access up the east arm, into the beautiful wetland and riparian woodland there. These are considered to be beneficial impacts.

4.11.3 Alternative 3 - Impacts to Scenic Resources

4.11.3.1 Temporary Adverse Impacts on Scenic Resources

The impacts summarized in Section 4.11.1.1 apply to Alternative 3. Temporary adverse impacts to scenic resources would occur during future phases of Alternative 3.

4.11.3.2 Long Term Benefits to Scenic Resources

Long term beneficial impacts summarized in Section 4.11.2.2 apply to Alternative 3.

4.11.4 No Action Alternative – Impacts to Scenic Resources

No beneficial impacts to existing resources would result from the No Action Alternative.

4.12 CUMULATIVE IMPACTS

4.12.1 Alternative 1 – Cumulative Impacts

The combined, incremental effects of the restoration of Mountain Lake, when added to other past, present, and foreseeable future actions within the City of San Francisco, would be a benefit to the environment. These actions include the following:

- Restoring wetlands at Crissy Field
- Restoring Lobos Creek
- Restoring the Tennessee Hollow watershed
- Restoring Islais Creek (Glen Canyon Park)
- Restoring wetlands at Shoreline Park (India Basin) north of Hunter's Point (as well as those to be restored as part of the shipyard cleanup)
- Constructing wetlands at Heron's Head Park near Pier 98 on San Francisco's southeast shoreline
- Restoring wetlands at Lake Merced
- Restoring wetlands at McLaren Park (Yee, pers. comm., 2000)

These actions would result in the long-term enhancement and protection of local marine and freshwater habitats. Restoration would aid in the perpetuation of individual species (by providing food and shelter for residents and migrants) and marsh and stream-side communities within the context of a heavily urbanized city where most of this habitat has been altered or destroyed. Restoration would not only be a benefit for the future of wildlife and for the improvement of water quality, but for the quality of life of San Francisco's inhabitants as well. While the projects may contribute to an overall increase in visitor use to the project areas (the concern being the potential increase in vehicle trips within the city and associated air emissions), these actions would promote

public understanding of the small fragments of original natural communities that still survive in San Francisco, and help guarantee their survival.

4.12.2 Alternative 2 (Proposed Action) - Cumulative Impacts

The impacts summarized in Section 4.10.1 apply to all phases of this Proposed Action.

4.12.3 Alternative 3 - Cumulative Impacts

The impacts summarized in Section 4.10.1 apply to all phases of this Proposed Action.

4.12.4 No Action Alternative - Cumulative Impacts

The Alternative would not contribute to the beneficial cumulative impacts of restoration projects throughout the City of San Francisco.

5. Consultation and Coordination

The Alternatives described in Section 3 are the result of an extensive public participation process. Public involvement began in October 1995 at "The Greening of the Presidio." This Presidio-wide symposium focused on Mountain Lake issues and included representatives from the public, Golden Gate Audubon, Friends of Mountain Lake Park, California Native Plant Society, the Presidio Golf Course, and the city of San Francisco. Additional Mountain Lake public meetings occurred between 1995 and 1999, prior to the start of the formal planning process for Mountain Lake. This public input has informed the planning and development of the Mountain Lake Enhancement Plan's Alternatives and Proposed Action.

5.1 PUBLIC CONCERNS AND ISSUES

The Alternatives and Proposed Action integrates responses and recommendations received from extensive consultation with groups, private citizens, neighbors to Mountain Lake, and federal, state, and local agencies. Public participation during the scoping phase included private citizens; neighborhood groups like Friends of Mountain Lake Park (FMLP), Neighborhood Associations for Presidio Planning (NAPP); institutions like the California Academy of Sciences, the University of California at Berkeley, and the University of San Francisco; and non-profit organizations like the Golden Gate Audubon Society and the California Native Plant Society.

This section summarizes public concerns and issues that surfaced during the scoping period that took place in Spring 2000. In addition to the comments submitted at the March 8, 2000 public meeting, the public was encouraged to provide additional input throughout the month-long scoping period.

Many groups and individuals acknowledged the necessity of dredging Mountain Lake as a means to improve water quality. The public expressed divergent opinions regarding public access: some individuals and groups supported maintaining existing levels of public access areas around the perimeter of the lake, while others supported minimizing trails in fragile natural areas to the north and east of the lake. Most members of the public agreed that visual screening of Park Presidio Boulevard was important. There was universal agreement regarding the need for expanded lake protection efforts, including habitat enhancement. Several individuals did not support the removal of any trees as a part of the enhancement effort, while others supported the phased removal of trees for habitat enhancement purposes. Many individuals and groups expressed concern regarding the proposed project's visual impacts to the area, and expressed interest in using a phased approach to mitigate for

visual impacts. Several neighbors and groups voiced concern regarding construction related impacts to public access, noise, and general disruption to the lake's visitation patterns.

5.1.1 Coordination with Ohlone/Costanoan Tribal Groups

Mountain Lake was likely seasonally inhabited by the native people of the San Francisco area, the Ohlone/Costanoans. Due to the potential for discovery of native archeological sites associated with early use of the site, coordination with Ohlone/Costanoan tribal groups and individuals was initiated during the public scoping process. Coordination with tribal groups and individuals would continue throughout the planning process, including during the development of the Archeological Management Assessment and Monitoring Program (AMA) for the Mountain Lake Enhancement Plan. If a native site is discovered in conjunction with construction activities at Mountain Lake, construction work would cease and tribal groups would be consulted. The discovery of any human remains or associated mortuary items covered under the Native American Graves Protection and Repatriation Act would be treated in accordance with 43 CFR 10.4 (Inadvertent Discoveries). Work would be conducted in accordance with the programmatic agreement that constitutes the Section 106 compliance for the Presidio General Management Plan Amendment.

5.2 AGENCY CONSULTATION AND PARTICIPATION

This Proposed Action and Alternatives reflect the Presidio Trust's request for early consultation with federal, state, and local authorities. Initial responses were received from the following authorities: Office of Historic Preservation; California Department of Transportation; United States Department of the Interior; U.S. Fish and Wildlife Service; U.S. Environmental Protection Agency; U.S. Army Corps of Engineers; San Francisco Regional Water Quality Control Board; City and County of San Francisco Parks and Recreation Department; City and County of San Francisco Planning Department; San Francisco Public Transportation Department. Specific project elements were developed to reflect the regulatory requirements and concerns of those authorities that participated in early consultation. Ongoing consultation would occur throughout the planning and construction phases of the Mountain Lake Enhancement Plan.

The following is a summary of agency comments received during the scoping period:

5.2.1 City and County of San Francisco Planning Department

The agency determined that since the proposed alternative did not include any actions on lands within the City's jurisdiction, City approvals and/or CEQA review were not required.

5.2.2 City and County of San Francisco Recreation and Parks Department

The Recreation and Park Department administers Mountain Lake Park, located to the south of the lake. This agency shared that Mountain Lake is a designated interpretive site for the Juan Bautista de

Anza National Historic Trail. The agency also questioned whether the lake bottom has been tested to confirm that the sediment does not contain hazardous substances.

The Plan treats the Juan Bautista de Anza National Historic Trail as a valuable recreational and historic resource. The trail is integrated into the overall trail/circulation plan for the Project Area, and interpretive signs would relay the de Anza trail's historic context to the public. The Presidio Trust Remediation Program is currently pursuing a Record of Decision (ROD) Amendment process to ensure that Mountain Lake bottom sediment is not contaminated. Initial consultant studies and U.S. Army recommendations suggest that the sediment does not exceed clean-up thresholds and would not require remedial action. A formal decision regarding this issue would be incorporated in the final ROD Amendment that is expected to be issued early Winter 2001. The outcome of this regulatory issue may affect the manner in which dredged lake bottom material is disposed of and/or used as part of the Mountain Lake Enhancement Project.

5.2.3 California Department of Transportation (CALTRANS) District 4

CALTRANS requested that the Mountain Lake Enhancement Plan/EA address how the project may affect Park Presidio Boulevard during construction, whether there were anticipated long-term effects upon the facility, and the degree to which construction staging areas and construction easements were required in the vicinity of the facility.

The operation of Park Presidio Boulevard would not be affected during the project's construction phases, construction easements would not be necessary and staging areas would be located away from the CALTRANS facility. It is also anticipated that long-term maintenance activities would not affect operations of the CALTRANS facility.

5.2.4 U.S. Environmental Protection Agency (EPA), Region IX

The EPA suggested that the deepening of Mountain Lake may require permits from the USCOE under Section 10 of the Clean Water Act, though it is unlikely that a Clean Water Act Section 404 Permit would be required. The agency also suggested that visitor parking at Mountain Lake be analyzed, specifically with respect to the potential for increased runoff into the Project Area. The agency was also interested in the cumulative effects of the project with respect to overall visitor use of the Park. Of particular concern was the potential for increased air emissions and vehicle trips to the Park.

The Presidio Trust would seek all applicable permits for the Mountain Lake Enhancement Plan construction process. Visitor parking and the effects of the plan on visitor use in the Park are assessed within this document.

5.2.5 U.S. Fish and Wildlife Service (USFWS)

The USFWS provided technical advisory comments that primarily addressed the need for clearly stated ecological goals and objectives. In the absence of specific ecological objectives and priorities, the agency believed it would be challenging to balance the competing interests of visitors and ecological restoration. The USFWS suggested that the project consider eradication of non-native fish populations, the re-introduction of California red-legged frogs, and the removal of non-native vegetation within the Project Area. The agency also urged the Presidio Trust to clearly evaluate the degree to which engineering is necessary to restore water quality and associated lake systems.

The Mountain Lake Enhancement Plan provides a framework of specific ecological and visitor use objectives, as embodied by the site plan for each Project Alternative. An overarching project goal guiding the formulation of Action Alternatives was to balance visitor use with the enhancement of lake and terrestrial ecological systems. Each of the concerns outlined by the USFWS are addressed within this document.

5.2.6 California Office of Historic Preservation

The agency requested that the Presidio Trust continue its process of completing its Section 106 responsibilities for the proposed project. The Presidio Trust would continue to consult with the State Historic Preservation Officer throughout the planning and implementation phases of the proposed project, to ensure that Section 106 obligations are met.

5.2.7 U.S. Department of the Interior, National Park Service (NPS)

The NPS requested that the Presidio Trust assess the potential for surviving historic or archeological resources within the Project Area, given Mountain Lake's historic role as a water source. The agency also recommended monitoring and assessment of all ground disturbances, including lake silt removal activities. The NPS recommended that the Presidio Trust initiate early and sustained coordination with local Native American groups, as well as the City of San Francisco. Each of these issues are addressed within this document. Pursuant to interagency agreement, the NPS is considered a cooperating agency for the purposes of this NEPA analysis.

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Appendix A: Project Review Form for Tank Removal

GOLDEN GATE NATIONAL RECREATION AREA
PROJECT REVIEW FORM FOR NEPA COMPLIANCE

PART 1 – PROJECT DATA

Project Title	Mountain Lake Tank and Pump Station Removal and Well Abandonment				
Project Location/Bldg #	South-east bank of Mountain Lake: Bldg's 318-319, 322-324, 348 & Rehab of Bldg 316		**Project Review #**		
Proposed Start Date	October 1, 2000		**Target End Date**	December 1, 2000	
Project Initiator/ Title	Cynthia East Skovlin, Planner, Presidio Trust James Kelly, Utility Manager, Presidio Trust		**Telephone #**	415-561-5073	
Is the Project on the GPRA Work Plan for the Fiscal Year?			**Yes**		**No**
Division Chief's Signature		**Date**		**Supervisor's Signature**	

PART 2 -- PROJECT DESCRIPTION

In the box below (and attached pages if required) briefly describe 1) the project that is being proposed; 2) the current conditions at the project area 3) the reason for the project; and 4) the proposed work plan to accomplish the project. **A map of the project location and/or a detailed site plan is mandatory and must be attached.**

Project Summary: There are three non-functioning irrigation wells around the perimeter of Mountain Lake. The wells and site locations are designated 316, 348, and 319 (see attached drawing). Though the fence and/or structure surrounding each well head is secure, the wells are an open conduit to the groundwater and the mere presence of an open well head presents an environmental hazard. Furthermore, the California Department of Health Services has request that, since these are non-functioning wells, they be closed in accordance with California Well Closure Standards (a copy of the California DHS letter is attached).

This project proposes to abandon the three wells, remove the associated pumping equipment, and, with the assistance of the NPS, return the landscape to original condition. The following Project Description summarizes our proposed work plan, the measures we will take to protect the public and environment, and the measures we will take to stabilize the site once construction activities are completed.

(CONTINUED ON ATTACHMENT)

PART 3 -- POTENTIAL IMPACTS CHECKLIST

Does The Proposed Project Have The Potential To:	YES	NO	*Does The Proposed Project Have The Potential To:*	YES	NO
1. Destroy, remove or result in the gradual deterioration of historic fabric, terrain or setting?		X	15. Increase traffic congestion, traffic volumes or adversely affect traffic safety for vehicles, pedestrians or bicyclists?	X	
2. Alter historic ground cover or vegetation?		X	16. Impede accessibility?		X
3. Introduce non-historic elements (visible, audible or atmospheric) into a historic setting, structure or environment?		X	17. Generate nuisance dust or odors?	X	
4. Reintroduce historic elements in a historic setting or environment?		X	18. Involve handling/storage of hazardous substances?		X
5. Adversely affect a unique geologic resource?		X	19. Maintain or create a public or employee safety or health hazard?		X
6. Disturb the ground surface or change the surface topography?	X		20. Block or substantially alter an existing view, be visually intrusive or contribute to a degraded visual condition?		X
7. Compromise slope stability?	X		21. Affect rare, endangered or sensitive species?		X
8. Change the pattern of surface water flow, lead to increased runoff or erosion?	X		22. Adversely affect wildlife (feeding, nests, dens, roosts, etc.)?		X
9. Degrade surface or ground water quality?	X		23. Add or remove plants?	X	
10. Involve issues of concern for park neighbors or organizations or generate media attention?	X		24. Affect wetland, riparian or coastal habitat?		X
11. Conflict with adjacent uses either private or public?		X	25. Attract animal or insect pests?		X
12. Adversely impact current or planned visitor services, access or available parking?	X		26. Increase demand for police services or create an attractive nuisance?		X
13. Perceptibly increase the background noise levels or expose people to loud noise?	X		27. Increase demand for fire protection services or increase wild fire hazard?		X
14. Increase vehicle emissions or emissions of other air pollutants?		X	28. Result in other cultural resource, natural resource or visitor services impacts?		X
15. Substantially increase the amount of energy or water used or waste generated?		X	29. Increase night lighting or glare?		X

PART 4 -- DISCUSSION OF IMPACT AND MITIGATION: In the box below briefly address each "Yes" answer from the Impacts Checklist in Part 3 above. Describe the potential impact and any recommendations for avoiding or reducing the impact. Use as many pages as needed to answer.

#6
IMPACT – Decommissioning of each site will impact and disturb surrounding soils. The restoration of the surface topography at well site 316 will require surface replacement fill. Throughout the entire project site, topography will be re-graded to stabilize site and maximize positive drainage towards Mountain Lake.
MITIGATION – As part of the Project Management Plan we will prepare and implement an construction phase erosion control plan, prepare and implement a site stabilization plan (including long term erosion control), assist with site revegetation per a NPA approved plan.

#7
IMPACT – Slope stability may be temporarily compromised during construction when water tanks #322 &323 are removed.
MITIGATION – This will be considered in the construction management plan and Best Management Practices will be observed. See attached Work Plan.

#8
IMPACT – During project implementation, there will be some localized redirection of water flow patterns at all sites, however the general direction of runoff will still be toward Mountain Lake.
MITIGATION – Following demolition, the site will be stabilized to prevent erosion. All exposed soil will be covered with fabric cloth, staked and retained with silt fencing. Straw bales will also be used in conjunction with these measures. All erosion control measures will be maintained until implementation of Mountain Lake Enhancement Plan.

#9
IMPACT – During construction, there is a potential that surface water quality may be degraded due to erosion. Also,

if it is determined that water tanks #322 & 323 are at water table level or below, there is the potential for ground water contamination.
MITIGATION – Best Management Practices will be observed to prevent either surface or groundwater contamination. For surface water issues, see Mitigation for Item #8 above.

#10
IMPACT – There will be temporary disturbance to walk ways due to deconstruction activities. Construction activities will be visible/audible to visitors to the park.
MITIGATION – Appropriate signage and public notice will be made and construction area safety procedures developed as part of the Project Management Plan. The public will be notified in advance of any trail closures.

#12
IMPACT – There will be temporary impact on visitor use of Juan Bautista de Anza trail in the vicinity of the project area due to deconstruction activities.
MITIGATION – A Project Management Plan will be developed to restrict construction access and staging so as to only partially obstruct trail, if at all. If the trail needs to temporarily closed, the public will be notified in advance through signage.

#13
IMPACT - During construction phase only.
MITIGATION – The Project Management Plan will fully address the noise issues. Currently, we are proposing to perform construction activities between 8:00 AM and 4:00 PM so as to minimize impact to nearby houses, and complete all site work on concurrent schedules in order to fast-track this project (minimize project duration).

#17
IMPACT - During construction phase only.
MITIGATION – Best Management Practices will be observed.

#18
IMPACT – At this time, it is not believed that hazardous substances are associated with the structures. Information is forthcoming from the Presidio Trust Remediation Program.
MITIGATION –If any Hazardous substances are discovered the Presidio Trust will develop an appropriate remediation plan.

#21
IMPACT – PLANT: Per Sharon Farrell, Ecologist, National Park Service and Joe Cannon, Ecologist, National Park Service, no known rare, endangered or sensitive plant species exist on the project site. ANIMAL: It is suspected, however that the site hosts Willow Fly Catcher and migratory water foul.
MITIGATION – Potential impacts to birds will be mitigated through construction timing (fall) and a well defined, localized construction zone.

#23
IMPACT – In the course of the ground disturbance during deconstruction activities, it is anticipated that some plants on-site will be removed. Joe Cannon, Ecologist, NPS, has identified on site the following species list (These are plants that may be potentially impacted or removed): Natives: Elmus glaucus (blue wild rye) and Rubus ursinius (California blackberry); Exotics: Rubus discolor (Himalayan blackberry), Raphanus sativus (wild radish), and Vinca major (periwinkle). In addition, minor tree trimming will be required at the construction site for access.
MITIGATION – Denuded areas in the construction zone will be covered temporarily with filter fabric, rather than hydro-seed or new plants. If the Mountain Lake Enhancement Plan is not implemented as expected during Fall/ Spring 2000, appropriate revegetation will occur following consultation w/ NPS Natural Resources Division staff.

#24
IMPACT – Well Site #319 is suspected to be in jurisdictional wetland; Well Site #316 is suspected to be in transitional wetland.
MITIGATION –Additional survey to determine site designation will be conducted by NPS by July 2000. The Presidio Trust will be working with the appropriate authorities (Army Corps of Engineers, Regional Water Quality Control Board) to acquire the necessary permits and observe the appropriate Best Management Practices.

PART 5 -- ALTERNATIVES

In the box below, briefly describe any other *reasonable* alternatives that were considered for accomplishing the project including alternative locations.

Four alternatives for this project were identified; these alternatives, along with a brief description, are summarized below. Alternative 4 was the selected plan of action.

Alternative 1 – No action. This was not a viable alternative since we were mandated by the California DHS to take action on these wells (close them).

Alternative 2 – Reactivate the wells as an irrigation water source. We investigated this option but dismissed it for the following reasons:

- We are developing a water management strategy that includes a long-term agreement with the CCSF and development of a reclaimed water system, additional irrigation water is not necessary.
- Unknown hydraulic impact on Mountain Lake and Lobos Creek.
- Cost prohibitive – in order to reactivate these wells for irrigation purposes would require a hydraulic study, down-hole investigation of the wells, new pumps and motors, new high voltage system, and new distribution piping. The payback on this project will exceed twenty years.

Alternative 3 – Abandon wells only. Leave all structures and piping in place. This alternative does meet the state requirements, however it does not address the remaining equipment and structures. The abandoned pipes, equipment, large open tanks, and abandoned buildings not only pose a hazard to the public; it is not in alignment with the goals of the Mountain Lake Enhancement Plan.

Alternative 4 – Abandon wells, remove all associated structures and piping, and return landscape to original condition. This alternative meets state requirements and minimizes the potential liability from the abandoned equipment. This alternative is consistent with the overall goals of the Mountain Lake Enhancement Plan.

PART 6 -- PROJECT COMPLIANCE AND APPROVALS

QUESTIONS 29 THROUGH 37 TO BE COMPLETED BY THE ENVIRONMENTAL PROTECTION SPECIALIST.

Would the Project:	**YES**	**NO**
29. Conform with the GMP, GMPA or a specific site plan?		
30. Promote sustainability?		
31. With mitigation applied, result in **no net loss** of park resources?		
32. Require utility connections (maintenance & engineering approval required)?		
33. Require new signage (sign committee approval required)?		
34. Involve excavation (requires utility clearance)? **If yes, enter date issued:**		
35. Require 5x review. **If yes, enter date issued & /5x project #:**		
36. Require GGNRA Advisory Commission Review		
37. Other agency permits (BCDC, USCOE, etc.) **If yes, specify:**		

DISCUSSION OF PROJECT PLANNING COMPLIANCE: In the box below briefly address "NO" answers for questions 29, 30 and 31.

****

ATTACHMENT FOR PART 2

PROJECT DESCRIPTION (cont'd.)
****

Work Plan: Decommissioning of these three sites involves, well abandonment by a certified contractor, select tree trimming, vegetation removal, erosion control, and site stabilization.

Well Site 316 – This well site is the largest of the three sites and is entirely enclosed by a 10-foot chain link fence. The well consists of a four-foot diameter concrete lined shaft that extends approximately 40 below grade surface where it then reduces to an 18" diameter well shaft (total well depth unknown). The supporting facilities at this site include a wooden well pump house (#316), two above ground irrigation water storage tanks (#322 – 35' dia. And #323 – 50' dia.), an irrigation pump house (#318) and a small pump enclosures (#324).

Summary of site structures:

1. Bldg. 316 – Non-Potable Water Pump (20 sq ft metal (historic, circa 1939); 10x12 timber encasement non-historic.
   Retain historic pump; retain and rehab (non-historic) housing structure; abandon (seal) well; install interpretive wayside exhibit of historic use of Mountain Lake and early Golf Course irrigation.
2. Bldg. 318 – Non-Potable Water Pump House (concrete, wood frame 15x22) (circa 1959): Demolish pump and structure; off-haul rubble
3. Bldg. 322 – Water Reservoir (72,000-gallon concrete tank-30 ft dia) (circa1956): Demolish tank; off-haul rubble, re-establish pre-existing topography with fill.
4. Bldg. 323 Water Reservoir (136,000-gallon concrete tank-50 ft dia) (circa 1958): Demolish tank; off-haul rubble, re-establish pre-existing topography will fill.
5. Bldg. 324 – Pumping Station/Pump House (concrete, wood, roll roofing 7x10) (circa 1956): Demolish pump and structure; off-haul rubble.
6. Pacific Gas & Electric Facilities – (6x6 metal cabinet, NEMA 3), overhead lines, two wood poles: Presidio Trust to reroute electricity to cable station through transformer on Golf Course; PG&E will remove switch station and associated power lines and wood poles.

Deconstruction of this site includes the following tasks:

1. Site Preparation (vegetation removal, tree trimming, install erosion control, prepare traffic control plan, and prepare pedestrian access control plan)
2. Abandon Well (note - to be performed by specialty contractor, see well abandonment section)
3. Demo Contractor mobilization/demobilization
4. Demo and Remove 10' high chain link fence
5. Demo and remove abandoned power poles and electrical wires (note- contractor to protect and preserve all PG&E electrical structures)
6. Demo and remove all piping and pump equipment, including pump house 316, 318 and 324 (note – contractor to remove and store well pump and motor contained in structure 316). NOTE: Water pump 316 is listed in the National Register of Historic Places as an historic object and is to be retained, preserved and interpreted as a cultural resource on site. However, to properly seal the appropriate well, it is necessary to temporarily remove the pump, store and replace once construction phase is complete.
7. Demo and remove irrigation pump house 318 (excluding foundation)
8. Demo remove irrigation pump house 318 foundation.
9. Demo above ground storage tanks 322 and 323.
10. Off-haul concrete rubble/construction debris.
11. Mobilize PG&E for decommissioning of PG&E owned electrical equipment.
12. Haul in clean, certified fill and regrade site per NPS approved grading plan.
13. Site cleanup and implement revegetation/soil stabilization plan.

Well Site 348 – This well site consists of a small sheet metal pump house enclosed by a chain link fence. This is a small site, the presidio Trust will decommission the entire site excluding abandonment of the well. Since this site is set back from Mountain Lake and decommissioning activities will take approximately two days. Erosion control will be provided as part of the post construction site stabilization.

Summary of site structures:

1. Bldg. 348 – Irrigation Well Pump House (7x10 concrete slab, corrugated metal building with roof) (circa 1959): Demolish pump and structure; off-haul rubble; seal well.

Deconstruction of this site includes the following tasks:
1. Site Preparation (vegetation removal and tree trimming – continue with traffic control and pedestrian control plan established for site 316)
2. Demo and remove pump house and piping
3. Abandon Well (note - to be performed by specialty contractor, see well abandonment section)
4. Regrade area to match surrounding (no fill required)
5. Site cleanup and implement revegetation/soil stabilization plan.

Well Site 319 – This well site consists of a boarded up, small sheet metal pump house. Since this is a small site, the presidio Trust will decommission the entire site excluding abandonment of the well. This site is adjacent to a paved walkway that borders CCSF Mountain Lake Park, pedestrian control will be a major factor in this project plan.

Summary of site structures:
1. Bldg. 319 – Non-Potable Water Pump House (concrete slab, wood walls, corrugated metal roof, 10' x 10') (circa 1959): Demolish pump and structure, off-haul rubble, abandon well;

Deconstruction of this site includes the following tasks:
1. Site Preparation (vegetation removal and tree trimming, install erosion control, prepare traffic control plan, and prepare pedestrian access control plan))
2. Demo and remove abandoned power pole
3. Demo and remove pump house and piping
4. Abandon Well (note - to be performed by specialty contractor, see well abandonment section)
6. Regrade area to match surrounding (no fill required)
7. Site cleanup and implement revegetation/soil stabilization plan.

Schedule: Begin October 1, 2000. Complete December 1, 2000.

Construction Management: By Presidio trust

Site Specific Erosion and Sediment Control Plan

Because the EPA storm water discharge permit applies to all construction activities, the Storm Water Pollution Prevention Plan (SWPPP) is rather general in nature so that it will apply to all site construction. Therefore, an erosion and sediment control plan that details controls specific to each individual construction project must be prepared and submitted to the site Project Manager for approval in coordination with the Presidio Trust permitting office. This site specific plan need not be an elaborate written document. A clearly labeled sketch of planned controls on a site layout drawing is sufficient. Site specific erosion and sediment control plans shall include the following:

- areas of soil disturbance (include borrow or stockpile areas)
- an outline of areas that will NOT be disturbed
- areas to be revegetated and other stabilization measures (temporary and permanent)
- structural erosion and sediment controls, such as check dams (straw bale dams and silt fence) both during construction and following construction
- locations of surface waters and wetlands near the construction site

Erosion and Sediment Controls

Construction-phase erosion and sediment controls will be designed to retain sediment on site to the extent practicable. Structural controls are primarily intended to divert storm water flows from exposed (disturbed) soils, store flows, or limit runoff and the discharge of pollutants from exposed areas of the site to the degree attainable. Examples of such practices include silt fences, earth dikes, drainage swales, sediment traps, check dams, subsurface drains, pipe slope drains, storm drain inlet protection, rock outlet protection, and temporary or permanent sediment basins. Stabilization practices are intended to keep disturbed soil in place, and can include such practices as temporary vegetation, permanent vegetation, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, and preservation of mature vegetation.

Sediment will be removed from all erosion and sediment controls when the design capacity has been reduced by 50%. This includes controls such as silt fences, check dams, and sediment traps and basins.

Minimize Disturbed Area:
Efforts will be made in site planning to minimize the disturbed area, preserving as much of the natural site topography, drainage features, and vegetation as possible.

Silt Fences:
The purpose of silt fences is to trap sediment entrained in slow-moving runoff, so they are ideally suited for the base of gentle slopes and along the downslope (again on gentle slopes) edges of disturbed areas. They should not be used at the base of steep slopes unless they are reinforced with hay bales or similar measure. Silt fences are normally constructed of a permeable geotextile material, but may also consist of hay bales installed in a continuous line with no breaks or gaps between bales. In order to be effective, both types of silt fences must be trenched into the soil about 6 inches and staked/stapled down, as shown on Figures 3 through 5.

Erosion Control Mats/Soil Guard:
Erosion control mats or hydromulch shall be placed on disturbed slopes and in other locations as needed. Generally, mats will be used for steeper slopes, with Soil Guard applied on moderate to gentle slopes.

Revegetation and Temporary Stabilization:
Following rough grading of the construction site, as much of the site as possible will be revegetated in accordance with an NPS approved Revegitation Plan. As areas of the site work are completed, revegetation shall begin within 14 days of completion of work in the area, or as soon as weather conditions. If revegetation is not possible then temporary stabilization measures will be implemented within 14 days of completion of work. If construction activities temporarily cease on an area and are not scheduled to begin again in that location for more than 21 days, temporary stabilization (e.g. mulch applied with tack or netting, soil retention blankets, temporary revegetation, etc.) measures will be put in place.

Waste Management and Disposal:
A Waste Management Plan will be prepared and followed on all sites.

Minimizing Vehicle Tracking of Soils:
Tracking of soil from the construction site onto paved roadways shall be minimized. Any soil tracked onto paved roadways shall be cleaned up daily. An appropriate method of cleaning shall be used, such as shoveling tracked mud back onto the construction site. Tracked mud shall not be washed into storm drains; all vulnerable storm drain inlets must have inlet protection installed.

Well Abandonment – Each site requires that one well be permanently closed. All wells will be closed by a licensed contractor in accordance with California Department of Health Services (DHS) Well Closure Standards as contained in Bulletin 74-90 (supplement to Bulletin 74-81). Closure of the wells will be supervised by Presidio Trust environmental staff with all closure documents being forwarded to the DHS and NPS.

PAGE 2 OF A LETTER TO BRIAN O'NEILL FROM THE CALIFORNIA DEPT. OF HEALTH SERVICES.
WELLS

and a survey of sanitary hazards, particularly sewerage, will be conducted of the Lobos Creek watershed to determine whether continued operation of the facility is feasible. The disaster preparedness and response plan shall address the ability of GGNRA and the City and County of San Francisco to respond with manpower and materials to survey and repair broken sewers. The plan shall also address the possibility of temporary bypass pumping of Lobos Creek from upstream of any sewer break or leak. The Presidio shall annually review and update this emergency plan, and submit a revised copy to the Department by April 18 of each year.

13. GGNRA shall comply with the Regulations Relating to Cross-Connections, Section 7583 *et seq.*, Title 17, California Code of Regulations. These requirements include, but are not limited to: 1) adoption of rules to implement the cross-connection control program; 2) conducting cross-connection surveys; 3) installation of backflow prevention devices; 4) personnel trained in cross-connection control; 5) annual testing of backflow prevention devices; and 6) recordkeeping. The Presidio shall at all times maintain at least 20 pounds per square inch of water pressure at every service connection in its distribution system.

14. By December 31, 1997, GGNRA shall develop a customer complaint response program for the Presidio of San Francisco water system.

X 15. By December 31, 1997, GGNRA shall destroy all abandoned wells at the Presidio per the California Water Well Standards, Bulletins 74-81 and 74-90, California Department of Water Resources.

16. All items required by this permit shall be subject to the review and approval of the San Francisco District, Drinking Water Field Operations Branch, California Department of Health Services, prior to implementation.

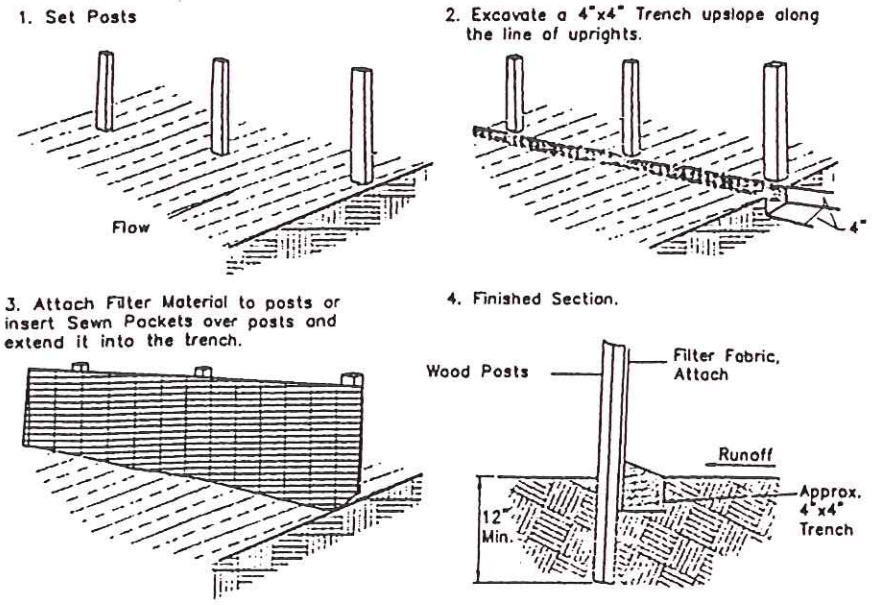
If you have any questions regarding this permit, please contact Mr. John Andrew at (510) 540-3227 or Mr. Michael Finn at (510) 540-2430.

Sincerely,

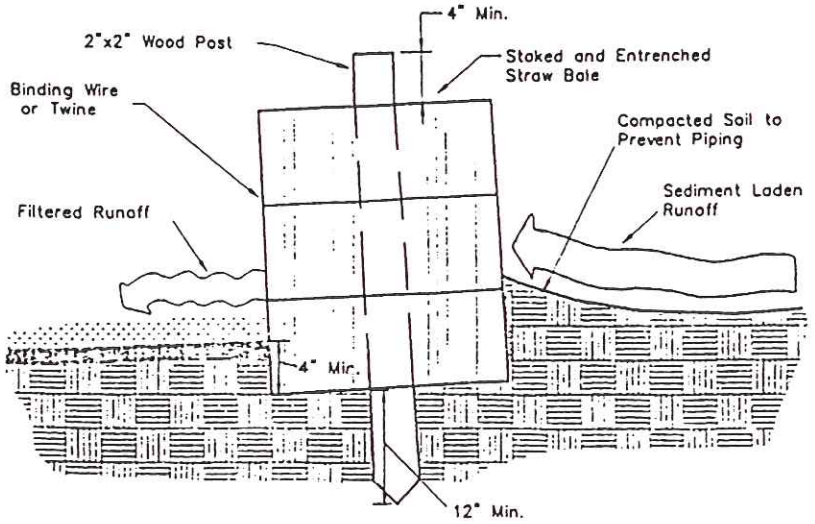
Clifford L. Bowen

Clifford L. Bowen, P.E.
District Engineer
San Francisco District
Drinking Water Field Operations Branch

Enclosures

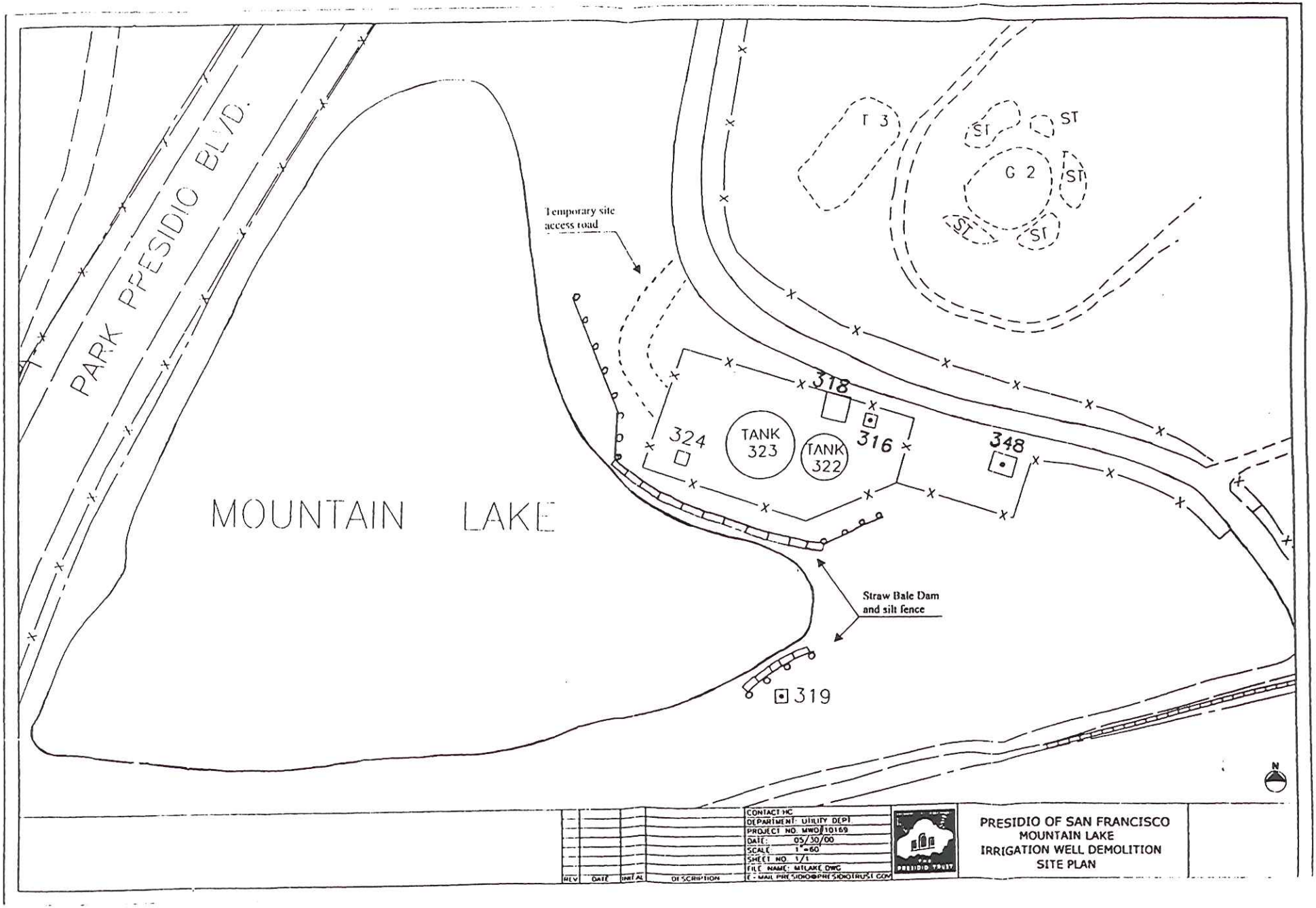


SILT FENCE
NOT TO SCALE



EROSION BALES
NOT TO SCALE

CONTACT:HC DEPARTMENT: UTILITY DEPT PROJECT NO. MWO#10169 DATE: 05/30/00 SCALE: 1"=60' SHEET NO. 1/1 FILE NAME: MTLAKE.DWG E-MAIL:PRESIDIO@PRESIDIOTRUST.GOV	THE PRESIDIO TRUST	PRESIDIO OF SAN FRANCISCO MOUNTAIN LAKE IRRIGATION WELL DEMOLITION SITE PLAN


PARK PRESIDIO BLVD.
MOUNTAIN LAKE
Temporary site access road
Straw Bale Dam and silt fence
T 3
G 2
ST
ST
ST
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ST
318
316
324
TANK 323
TANK 322
348
319
N
CONTACT:MC
DEPARTMENT: UTILITY DEPT
PROJECT NO. MWO#10169
DATE: 05/30/00
SCALE: 1"=60'
SHEET NO. 1/1
FILE NAME: MTLAKE.DWG
E-MAIL PRESHOO@PRESHOTRUST.COM
REV
DATE
INITIAL
DESCRIPTION
PRESIDIO TRUST
PRESIDIO OF SAN FRANCISCO
MOUNTAIN LAKE
IRRIGATION WELL DEMOLITION
SITE PLAN

Appendix B: Birds Observed at Mountain Lake

c = common u = uncommon * = tree nesters
fc = frequent r = rare ** = ground nesters

Species	Frequency
Podicepidae (Grebes)	
Pied-billed Grebe*	c
Horned Grebe	r
Phalacrocoracidae (Cormorants)	
Double-crested Cormorant	fc
Ardeidae (Herons)	
Black-crowned Night Heron*	u
Green Heron	r
Snowy Egret	r
Great Egret	fc
Great Blue Heron	fc
Anatidae (Swans, Geese, and Ducks)	
Mallard*	c
American Widgeon	r
Ring-necked Duck	r
Bufflehead	r
Ruddy Duck	u
Canvasback	r
Cathartidae (American Vultures)	
Turkey Vulture	u
Accipitridae (Hawks, Eagles, Harriers)	
Osprey	u
Sharp-shinned Hawk - **Special Concern**	u
Cooper's Hawk* - **Special Concern**	u
Red-shouldered Hawk*	c
Red-tailed Hawk*	c
Falconidae (falcons)	
American Kestrel*	r

Species	Frequency
Merlin - **Special Concern**	r
Peregrine Falcon	r
Galliformes (Quail and Grouse)	
California Quail*	x
Rallidae (Rails, Gallinules and Coots)	
American Coot*	c
Common Moorhen	r
Sora	r
Charadriidae (Plovers)	
Killdeer*	u
Scolopacidae (Sandpipers and relatives)	
Dowitcher spp.	r
Common Snipe	r
Laridae (Gulls and Terns)	
Mew Gull	c
Ring-billed Gull	c
California Gull	c
Herring Gull	r
Thayer's Gull	r
Western Gull*	c
Glaucaus-winged Gull	c
Caspian Tern	u
Columbidae (Doves and Pigeons)	
Rock Dove*	c
Band tailed Pigeon*	u
Mourning Dove*	c
Tytonidae (Barn Owls)	
Barn Owl*	r
Strigidae (Typical Owls)	
Western Screech-Owl*	x
Great Horned Owl*	u
Apodidae (Swifts)	
White-throated Swift	r
Trochilidae (Hummingbirds)	
Anna's Hummingbird*	c
Rufous Hummingbird	r
Allen's Hummingbird *	c

Species	Frequency
Alecidinidae (Kingfishers)	
Belted Kingfisher	u
Picidae (Woodpeckers)	
Acorn Woodpecker	r
Red-breasted Sapsucker	u
Downy Woodpecker*	c
Hairy Woodpecker*	u
Northern Flicker	c
Tyranidae (Tyrant Flycatchers)	
Olive-sided Flycatcher* - **Special Concern**	u
Western Wood-Pewee	u
Willow Flycatcher - **State Endangered**	u
Pacific-slope Flycatcher*	fc
Black Phoebe*	c
Say's Phoebe	r
Ash-throated Flycatcher	r
Vireonidae (Vireos)	
Solitary Vireo	u
Hutton's Vireo*	fc
Warbling Vireo	u
Corvidae (Jays, Magpies, Crows and Ravens)	
Steller's Jay*	r
Western Scrub-Jay*	c
American Crow*	c
Common Raven*	c
Hirundinidae (Swallows)	
Tree Swallow*	u
Violate-green Swallow*	c
N. Rough-winged Swallow	u
Cliff Swallow*	c
Barn Swallow*	c
Paridae (Chickadees and Titmice)	
Chestnut-backed Chickadee*	c
Aegithalidae (Bushtits)	
Bushtit*	c
Certhiidae (Creepers)	
Brown Creeper*	c
Sittidae (Nuthatches)	
Red-breasted Nuthatch	r

Species	Frequency
Pygmy Nuthatch*	c
Troglodytidae (Wrens)	
Bewick's Wren	r
House Wren	r
Winter Wren*	c
Marsh Wren	c
Regulidae (Kinglets)	
Golden-crowned Kinglet	fc
Ruby-crowned Kinglet	c
Turdidae (Thrushes)	
Swainson's Thrush*	u
Hermit Thrush	c
American Robin*	c
Varied Thrush	u
Mimiidae (Mimic Thrushes)	
Northern Mockingbird*	u
Sturnidae (Starlings)	
European Starling*	c
Bombycillidae (Silky Flycathers)	
Cedar Waxwing	fc
Parulinae (Wood Warblers)	
Orange-Crowned Warbler**	fc
Nashville Warbler	r
Yellow Warbler ** - **Special Concern**	u
Yellow-rumped Warbler	c
Black-throated Gray Warbler	u
Townsend's Warbler	c
Hermit Warbler	u
Northern Waterthrush	r
Black-and-white Warbler	r
Black-throated blue Warbler	r
American Redstart	r
MacGillivray's Warbler	r
Common Yellowthroat	u
Wilson's Warbler**	c
Thraupine (Tanagers)	
Western Tanager	fc
Emberizinae (Sparrows)	
Spotted Towhee	r

Species	Frequency
California Towhee*	fc
Chipping Sparrow	r
Clay-colored Sparrow	r
Savannah Sparrow	
Fox Sparrow	c
Song Sparrow*	c
Lincoln's Sparrow	fc
Swamp Sparrow	r
White-throated Sparrow	u
Golden-crowned Sparrow	c
White-crowned Sparrow*	c
Dark-eyed Junco**	c
Cardinalinae (Grosbeaks and Buntings)	
Rose-breasted Grosbeak	r
Black-headed Grosbeak	u
Icterninae (Blackbirds and Relatives)	
Red-winged Blackbird	c
Tricolored Blackbird	r
Western Meadowlark	u
Brewer's Blackbird*	c
Brown-headed Cowbird*	fc
Hooded Oriole*	u
Bullock's Oriole	u
Fringillidae (Finches)	
Purple Finch*	fc
House Finch*	c
Red Crossbill*	r
Pine Siskin*	fc
Lesser Goldfinch*	u
American Goldfinch*	u
Passeridae (Old World Sparrows)	
House Sparrow*	c

Source: J. Clark, Point Reyes Bird Observatory; California Academy of Sciences

Appendix C: USFWS List of Potential Special Status Species for Mountain Lake

ATTACHMENT A

Endangered and Threatened Species that May Occur in or be Affected by
PROJECTS IN SAN FRANCISCO COUNTY
Reference File No. 1-1-00-SP-3014
October 2, 2000

Listed Species

Mammals

sei whale, *Balaenoptera borealis* (E)
blue whale, *Balaenoptera musculus* (E)
finback (=fin) whale, *Balaenoptera physalus* (E)
right whale, *Eubalaena glacialis* (E)
humpback whale, *Megaptera novaeangliae* (E)
sperm whale, *Physeter catodon (=macrocephalus)* (E)
salt marsh harvest mouse, *Reithrodontomys raviventris* (E)
Guadalupe fur seal, *Arctocephalus townsendi* (T)
Critical Habitat, Steller (=northern) sea-lion, *Eumetopias jubatus* (T)
Steller (=northern) sea-lion, *Eumetopias jubatus* (T)

Birds

California brown pelican, *Pelecanus occidentalis californicus* (E)
California clapper rail, *Rallus longirostris obsoletus* (E)
western snowy plover, *Charadrius alexandrinus nivosus* (T)
bald eagle, *Haliaeetus leucocephalus* (T)

Reptiles

leatherback turtle, *Dermochelys coriacea* (E)
loggerhead turtle, *Caretta caretta* (T)
green turtle, *Chelonia mydas (incl. agassizi)* (T)
olive (=Pacific) ridley sea turtle, *Lepidochelys olivacea* (T)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

tidewater goby, *Eucyclogobius newberryi* (E)
Critical habitat, winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)
winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)
delta smelt, *Hypomesus transpacificus* (T)
Central California Coastal steelhead, *Oncorhynchus mykiss* (T)
Sacramento splittail, *Pogonichthys macrolepidotus* (T)

Invertebrates

mission blue butterfly, *Icaricia icarioides missionensis* (E)
San Bruno elfin butterfly, *Incisalia mossii bayensis* (E)

Plants

Presidio manzanita, *Arctostaphylos hookeri ssp. ravenii* (E)
Presidio clarkia, *Clarkia franciscana* (E)
San Francisco lessingia, *Lessingia germanorum* (E)
Marin dwarf-flax, *Hesperolinon congestum* (T)
marsh sandwort, *Arenaria paludicola* (E) *
beach layia, *Layia carnosa* (E) *

Proposed Species

Birds

short-tailed albatross, *Diomedea albatrus* (PE)

Invertebrates

white abalone, *Haliotes sorenseni* (PE)

Candidate Species

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Invertebrates

black abalone, *Haliotes cracherodii* (C)

Species of Concern

Mammals

gray whale, *Eschrichtius robustus* (D)
Pacific western big-eared bat, *Corynorhinus (=Plecotus) townsendii townsendii* (SC)
greater western mastiff-bat, *Eumops perotis californicus* (SC)
long-eared myotis bat, *Myotis evotis* (SC)
fringed myotis bat, *Myotis thysanodes* (SC)
long-legged myotis bat, *Myotis volans* (SC)
Yuma myotis bat, *Myotis yumanensis* (SC)
San Francisco dusky-footed woodrat, *Neotoma fuscipes annectens* (SC)
salt marsh vagrant shrew, *Sorex vagrans halicoetes* (SC)

Birds

little willow flycatcher, *Empidonax traillii brewsteri* (CA)
black rail, *Laterallus jamaicensis coturniculus* (CA)
bank swallow, *Riparia riparia* (CA)
American peregrine falcon, *Falco peregrinus anatum* (D)
Black-Crowned Night Heron, *Nycticorax nycticorax* (MB)
tricolored blackbird, *Agelaius tricolor* (SC)
grasshopper sparrow, *Ammodramus savannarum* (SC)
Bell's sage sparrow, *Amphispiza belli belli* (SC)
American bittern, *Botaurus lentiginosus* (SC)

ferruginous hawk, *Buteo regalis* (SC)
Vaux's swift, *Chaetura vauxi* (SC)
lark sparrow, *Chondestes grammacus* (SC)
olive-sided flycatcher, *Contopus cooperi* (SC)
hermit warbler, *Dendroica occidentalis* (SC)
white-tailed (=black shouldered) kite, *Elanus leucurus* (SC)
Pacific-slope flycatcher, *Empidonax difficilis* (SC)
common loon, *Gavia immer* (SC)
saltmarsh common yellowthroat, *Geothlypis trichas sinuosa* (SC)
loggerhead shrike, *Lanius ludovicianus* (SC)
Alameda (South Bay) song sparrow, *Melospiza melodia pusillula* (SC)
long-billed curlew, *Numenius americanus* (SC)
ashy storm-petrel, *Oceanodroma homochroa* (SC)
rufous hummingbird, *Selasphorus rufus* (SC)
Allen's hummingbird, *Selasphorus sasin* (SC)
red-breasted sapsucker, *Sphyrapicus ruber* (SC)
elegant tern, *Sterna elegans* (SC)
Xantus' murrelet, *Synthliboramphus hypoleucus* (SC)
Bewick's wren, *Thryomanes bewickii* (SC)

Reptiles

northwestern pond turtle, *Clemmys marmorata marmorata* (SC)
southwestern pond turtle, *Clemmys marmorata pallida* (SC)
California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

foothill yellow-legged frog, *Rana boylii* (SC)

Fish

green sturgeon, *Acipenser medirostris* (SC)
river lamprey, *Lampetra ayresi* (SC)
Pacific lamprey, *Lampetra tridentata* (SC)
longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

Opler's longhorn moth, *Adela oplerella* (SC)
sandy beach tiger beetle, *Cicindela hirticollis gravida* (SC)
globose dune beetle, *Coelus globosus* (SC)
Ricksecker's water scavenger beetle, *Hydrochara rickseckeri* (SC)
bumblebee scarab beetle, *Lichnanthe ursina* (SC)

Plants

San Francisco Bay spineflower, *Chorizanthe cuspidata var. cuspidata* (SC)
San Francisco wallflower, *Erysimum franciscanum* (SC)

fragrant fritillary, *Fritillaria liliacea* (SC)
San Francisco gumplant, *Grindelia hirsutula var. maritima* (SC)
Marin checkermallow, *Sidalcea hickmanii ssp. viridis* (SC)
Mission Delores campion, *Silene verecunda ssp. verecunda* (SC)
San Francisco owl's-clover, *Triphysaria floribunda* (SC)
San Francisco popcornflower, *Plagiobothrys diffusus* (CA) *
alkali milk-vetch, *Astragalus tener var. tener* (SC) *
compact cobweb thistle, *Cirsium occidentale var. compactum* (SC) *
Diablo helianthella (=rock-rose), *Helianthella castanea* (SC) *
Kellogg's (wedge-leaved) horkelia, *Horkelia cuneata ssp. sericea* (SC) *
adobe sanicle, *Sanicula maritima* (SC) *
San Francisco manzanita, *Arctostaphylos hookeri ssp. franciscana* (SC) **
coast lily, *Lilium maritimum* (SC) ?*

KEY:

(E)	*Endangered*	Listed (in the Federal Register) as being in danger of extinction.
(T)	*Threatened*	Listed as likely to become endangered within the foreseeable future.
(P)	*Proposed*	Officially proposed (in the Federal Register) for listing as endangered or threatened.
(PX)	*Proposed Critical Habitat*	Proposed as an area essential to the conservation of the species.
(C)	*Candidate*	Candidate to become a *proposed* species.
(SC)	*Species of Concern*	Other species of concern to the Service.
(D)	*Delisted*	Delisted. Status to be monitored for 5 years.
(CA)	*State-Listed*	Listed as threatened or endangered by the State of California.
*	*Extirpated*	Possibly extirpated from the area.
**	*Extinct*	Possibly extinct
	Critical Habitat	Area essential to the conservation of a species.

ATTACHMENT A

Endangered and Threatened Species that May Occur in
or be Affected by Projects in the Selected Quads Listed Below
Reference File No. 1-1-00-SP-3014
October 2, 2000

QUAD : 466C SAN FRANCISCO NORTH

Listed Species

Mammals

Guadalupe fur seal, *Arctocephalus townsendi* (T)

sei whale, *Balaenoptera borealis* (E)

blue whale, *Balaenoptera musculus* (E)

finback (=fin) whale, *Balaenoptera physalus* (E)

right whale, *Eubalaena glacialis* (E)

Critical Habitat, Steller (=northern) sea-lion, *Eumetopias jubatus* (T)

Steller (=northern) sea-lion, *Eumetopias jubatus* (T)

sperm whale, *Physeter catodon (=macrocephalus)* (E)

salt marsh harvest mouse, *Reithrodontomys raviventris* (E) *

Birds

western snowy plover, *Charadrius alexandrinus nivosus* (T)

bald eagle, *Haliaeetus leucocephalus* (T)

California brown pelican, *Pelecanus occidentalis californicus* (E)

California clapper rail, *Rallus longirostris obsoletus* (E) *

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

delta smelt, *Hypomesus transpacificus* (T)

Critical habitat, coho salmon - central CA coast, *Oncorhynchus kisutch* (T)

coho salmon - central CA coast, *Oncorhynchus kisutch* (T)

Central California Coastal steelhead, *Oncorhynchus mykiss* (T)

Critical habitat, winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)

winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)

Central Valley spring-run chinook salmon, *Oncorhynchus tshawytscha* (T)

Sacramento splittail, *Pogonichthys macrolepidotus* (T)

Invertebrates

mission blue butterfly, *Icaricia icarioides missionensis* (E)

San Bruno elfin butterfly, *Incisalia mossii bayensis* (E)

Plants

Presidio manzanita, *Arctostaphylos hookeri ssp. ravenii* (E)

marsh sandwort, *Arenaria paludicola* (E) *

Presidio clarkia, *Clarkia franciscana* (E)

Marin dwarf-flax, *Hesperolinon congestum* (T)

beach layia, *Layia carnosa* (E) *

San Francisco lessingia, *Lessingia germanorum* (E)

Proposed Species

Birds

short-tailed albatross, *Diomedea albatrus* (PE)

Fish

Critical Habitat, Central Valley spring-run chinook, *Oncorhynchus tshawytscha* (PX)

Invertebrates

white abalone, *Haliotes sorenseni* (PE)

Candidate Species

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Fish

Central Valley fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha* (C)

Invertebrates

black abalone, *Haliotes cracherodii* (C)

Species of Concern

Mammals

Pacific western big-eared bat, *Corynorhinus (=Plecotus) townsendii townsendii* (SC)

gray whale, *Eschrichtius robustus* (D)

greater western mastiff-bat, *Eumops perotis californicus* (SC)

long-eared myotis bat, *Myotis evotis* (SC)

fringed myotis bat, *Myotis thysanodes* (SC)

long-legged myotis bat, *Myotis volans* (SC)

Yuma myotis bat, *Myotis yumanensis* (SC)

San Francisco dusky-footed woodrat, *Neotoma fuscipes annectens* (SC)

Point Reyes jumping mouse, *Zapus trinotatus orarius* (SC)

Birds

tricolored blackbird, *Agelaius tricolor* (SC)

Bell's sage sparrow, *Amphispiza belli belli* (SC)

ferruginous hawk, *Buteo regalis* (SC)

little willow flycatcher, *Empidonax traillii brewsteri* (CA)

American peregrine falcon, *Falco peregrinus anatum* (D)

saltmarsh common yellowthroat, *Geothlypis trichas sinuosa* (SC)

black rail, *Laterallus jamaicensis coturniculus* (CA)

ashy storm-petrel, *Oceanodroma homochroa* (SC)

Reptiles

northwestern pond turtle, *Clemmys marmorata marmorata* (SC)

southwestern pond turtle, *Clemmys marmorata pallida* (SC)

California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

foothill yellow-legged frog, *Rana boylii* (SC)

Fish

longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

Opler's longhorn moth, *Adela oplerella* (SC)

sandy beach tiger beetle, *Cicindela hirticollis gravida* (SC)

globose dune beetle, *Coelus globosus* (SC)

Ricksecker's water scavenger beetle, *Hydrochara rickseckeri* (SC)

bumblebee scarab beetle, *Lichnanthe ursina* (SC)

Plants

San Francisco manzanita, *Arctostaphylos hookeri ssp. franciscana* (SC) **

alkali milk-vetch, *Astragalus tener var. tener* (SC) *

San Francisco Bay spineflower, *Chorizanthe cuspidata var. cuspidata* (SC)

San Francisco gumplant, *Grindelia hirsutula var. maritima* (SC)

Kellogg's (wedge-leaved) horkelia, *Horkelia cuneata ssp. sericea* (SC) *

San Francisco popcornflower, *Plagiobothrys diffusus* (CA) *

adobe sanicle, *Sanicula maritima* (SC) *

Marin checkermallow, *Sidalcea hickmanii ssp. viridis* (SC)

Mission Delores campion, *Silene verecunda ssp. verecunda* (SC)

San Francisco owl's-clover, *Triphysaria floribunda* (SC)

KEY:

(E)	*Endangered*	Listed (in the Federal Register) as being in danger of extinction.
(T)	*Threatened*	Listed as likely to become endangered within the foreseeable future.
(P)	*Proposed*	Officially proposed (in the Federal Register) for listing as endangered or threatened.
(PX)	*Proposed Critical Habitat*	Proposed as an area essential to the conservation of the species.
(C)	*Candidate*	Candidate to become a *proposed* species.
(SC)	*Species of Concern*	May be endangered or threatened. Not enough biological information has been gathered to support listing at this time.
(MB)	*Migratory Bird*	Migratory bird
(D)	*Delisted*	Delisted. Status to be monitored for 5 years.
(CA)	*State-Listed*	Listed as threatened or endangered by the State of California.
(*)	*Extirpated*	Possibly extirpated from this quad.
(**)	*Extinct*	Possibly extinct.
	Critical Habitat	Area essential to the conservation of a species.

Appendix D: Control of Non-Native Aquatic Species at Mountain Lake

Central to the success of the enhancement of aquatic vegetation, of common, native aquatic species, and to the reintroduction of special-status native aquatic species is the sustainable control of non-native aquatic species. The control of non-native fish, especially carp, is important to the successful re-establishment of submergent vegetation. Carp have been shown to reduce macrophyte densities by increasing turbidity through the resuspension of bottom sediments (reduced light penetration) and uprooting (Parkos and Wahl, 2000; Nico, 1999). In fact, the introduction of triploid grass carp (sterile) have been heavily discussed as a biocontrol method for controlling particular rooted aquatic plant weeds. Carp also indirectly affect submergent plant establishment by increasing the amount of available nutrients in the water column for algae growth. Resuspension of sediments by carp have been shown to increase the amount of total phosphorus in the water (Parkos and Wahl, 2000).

Several species of exotic fish are found in Mountain Lake. Fish present in Mountain Lake include carp, channel catfish, bass, hitch (*Lavinia exilicauda*), and fathead minnows (*Pimephales promelas*). Exotic crayfish *(Pacifasticus leniusculus)* have also been recorded at Mountain Lake. This preponderance of larger fish are probably lowering the numbers of smaller planktivorous fish and zooplankton (e.g., Daphnia), thereby contributing to algae blooms that have been recorded in the lake (Horne, 2000).

A variety of options are available to control non-native aquatic species (Wiley and Wydosky, 1993). The control options include:

- Biological Control
- Water level manipulation
- Mechanical removal of fish including seines, electricity, gill nets, trawls, fishing
- Chemical treatment

None of these options, with the possible exception of chemical treatment, are typically successful with single applications. In addition, an aggressively enforced "no dumping" of fish policy would be required to prevent reintroductions. The most common option of biological control would be to release a non-breeding fish that would prey on the non-native fish species. Currently, spotted bass are

abundant within the lake and likely control the recruitment of bullfrogs and to some extent, common carp. However, the spotted bass at Mountain Lake are breeding.

Water level manipulations are a common means of controlling fish. Ponds can be entirely drained to strand fish or drained to the extent that fish are concentrated in a small area and perish because of oxygen depletion. The potential to use this approach is unknown because Mountain Lake is groundwater fed and may not be possible to drain fully.

Mechanical removal of fish can be conducted in a variety of ways. Seines are limited in use to shallow areas lacking obstructions and need to be timed to occur during localized concentrations of fish (e.g., carp spawning aggregations). Conversely, boat operated trawls are ineffective in shallows, but could be an effective way to harvest fish from deeper portions of the lake if there are no obstructions. Boat-based electrofishing equipment can be used to deplete the amount of fish present in the lake, but is rarely successful at removing all fish. Gill nets are often used to remove certain size classes of fish. However, gill nets deployed over long periods of time can cause accidental mortality for diving birds and turtles that may get entangled in the net. They are also ineffective on small fish. Fishing often helps reduce certain sizes of gamefish (e.g., bass) but are generally ineffective for non-gamefish (e.g., carp). These mechanical removal methods would assist in reducing the number of non-native fish. However, these mechanical methods also would require repeated applications for the foreseeable future.

Chemical treatment of waterbodies with a fish toxicant is common, and is perhaps the most effective means of fish control. Four toxicants are currently registered for use as piscicides in the United States (rotenone, antimycin, and two lampricides) (Wiley and Wydoski, 1993). Rotenone is the most commonly used piscicide and is a natural substance derived from the stems and roots of certain tropical plants (Mississippi State University Extension Service, 1999). Rotenone treatment works best when the surface area and volume to be treated is low. Unlike many of the mechanical treatments, it can be used successfully to remove small fish. Rotenone's break-down rate depends on temperature, alkalinity, light, and oxygen. At 80° F, treated water would detoxify in about 4 days (Mississippi State University Extension Service, 1999). Treated lakes are generally considered safe for restocking after 5 weeks (Mississippi State University Extension Service, 1999). The mobility of rotenone in soils is slight because it is strongly bound to organic matter in soil. In sandy soils, the expected leaching distance is 8 cm (Oregon Department of Fish and Wildlife, n.d.). At concentrations used to control fish, rotenone is toxic to certain zooplankton and larval amphibians, but common aquatic invertebrates less so (Oregon Department of Fish and Wildlife, n.d.).

Appendix E: Reintroducing Special Status Species to Mountain Lake

Mountain Lake represents an opportunity to re-establish special-status native aquatic fauna. However, educational and ecological benefits should be weighed against operational costs, sustainability, and benefits to the recovery of the species. Re-establishment of special-status aquatic species provide the following benefits:

Educational

- Provide opportunities for the general public to learn about an endangered species in an urban and accessible environment.
- Provide research opportunities for local colleges and universities to evaluate the success/failure of restoring sensitive species in an urban environment and provide opportunities for adapative ecological management.

Ecological

- Facilitate an exciting Presidio-wide ecological planning process because of the need for several interconnected localities to have populations of special-status aquatic species to ensure long-term viability (e.g., Tennessee Hollow/Crissy Wetland, Lobos Creek, Fort Scott/Dragonfly Creek).
- Establishment of threatened and endangered species would protect essential habitat features for all species that may be threatened by adverse activities (e.g., protection of wildlife movement corridors, facilitate garbage control)
- A potential source of propagules should localized extirpation occur at other localities within the Park.

However, the costs and potential constraints include:

- Uncertain ability to have sustainable control of non-native aquatic animals.
- Inability to protect essential habitat features outside the footprint of the lake.
- Potential public concern regarding control methods for non-native aquatic animals.
- Permitting issues.
- Identification of suitable donor populations.
- Concerns regarding the legitimate benefits to the recovery of the species.

To assist in evaluating these issues, we used the draft recovery plan for the California red-legged frog, which has established criteria for evaluating the feasibility of reintroduction efforts for the frog (USFWS 2000). These criteria are as follows:

1. The California red-legged frog formerly occupied the general area;
2. The habitat appears to be suitable, it is under long-term protection, and predators (especially exotic fishes and frogs) can be eliminated or kept to manageable levels;
3. The reasons for the species' absence have been determined and eliminated or minimized;
4. No reproducing populations of the California red-legged frog remain in the area, and it is not likely to be reinvaded from surrounding populations in the near future;
5. The effort can commit to:
    - Releases of propagules at each site through at least 5 consecutive years, preferably at several sites within the area; and
    - Monitoring for at least 10 years after the last release.

This criteria has been used at the GGNRA to assess the feasibility of establishing both red-legged frogs and western pond turtles.

Criteria 1: The California red-legged frog (and turtle) formerly occupied the general area.

Historically, the federally threatened California red-legged frog *(Rana aurora draytonii*) and species of concern western pond turtle (*Clemmys marmorata*) were likely abundant at Mountain Lake. The California Academy of Science has a record of red-legged frog specimen from Mountain Lake collected prior to 1906 (J. Vindum, pers. comm. 1999). Currently, there is only one known population of California red-legged frogs in San Francisco (E. Ely pers. comm., 1996).

No historic references to western pond turtles at Mountain Lake have been found, although references to western pond turtles from San Francisco between 1856 and 1892 have been identified in museum collections by M.R. Jennings and M.P. Hayes. At Mountain Lake, no western pond turtles were found in surveys conducted for the Presidio General Management Plan or in visual surveys in 1996 by the Park. Only introduced red-eared sliders and soft-shelled turtles have been observed at Mountain Lake.

Criteria 2: The habitat appears to be suitable, it is under long-term protection, and predators (especially exotic fishes and frogs) can be eliminated or kept to manageable levels.

Under existing conditions, poor habitat exits for both western pond turtles and red-legged frogs. The draft frog recovery plan suggests that feasible re-introduction sites have a "favorable mix of breeding, rearing, and summer habitats relatively free from predators." Re-introduction of red-legged frogs without any sustainable habitat improvements and long-term protection would not be successful or likely even permitted by the U.S. Fish and Wildlife Service.

To assist in assessing this criteria, habitat requirements for the critical life stages of pond turtles and frogs and the abilities to achieve such habitat requirements are evaluated below.

Western Pond Turtles

Nesting success and juvenile rearing habitat are likely limiting factors for establishing a sustainable population at Mountain Lake. Turtle nest sites are typically in well drained soils, low slope (<25%), and south, southeast or southwest facing slopes (Holland, 1994; Holland, 1991). Vegetation at nest sites are usually characterized by grasses and/or forbs with shrubs and trees generally uncommon (Holland, 1994). Pond turtle eggs exposed to significant amounts of moisture either fail to develop or produce a lower overall rate of hatching success (Holland, 1994).

These variables were used to model the suitability of potential nest sites around Mountain Lake. Model output indicates that suitable nest sites are limited. At Mountain Lake, the only south facing slopes occur on the golf course side of the lake. The irrigated golf course (assuming turtles can climb fences) would also prevent successful egg development. The southeast facing slopes near the Public Health Hospital are bisected by Park Presidio, and likely inaccessible unless turtles can find and use the pedestrian undercrossing. Removal of eucalyptus trees along the northeast shore and development of an open woodland/grassland would provide some potential nesting location for turtles. Increased nesting habitat may also be possible by reducing the area of irrigated greens and relocation of golf course fence. Nesting habitat may also be available by relocating the fence that bisects the east arm of Mountain Lake and removal of shade-producing eucalyptus trees.

The urban nature of Mountain Lake would likely hinder nesting success unless measures to reduce unnatural levels of predators are instituted. Typical nest predators include skunks, raccoons, and coyote (Holland, 1994). Raccoon predation have reportedly resulted in the loss of up to 97% of turtle nests in a given area (Holland, 1994). It is likely that presence of accessible garbage and pet food has resulted in unnaturally elevated levels of skunks and raccoons.

Shallow water habitat for hatchlings and young-of-the-year is currently limited and no improvements are included in the existing design. Hatchlings and young-of-the-year typically require waters (<30 cm in depth) with emergent vegetation and downed woody materials (Holland, 1994). In addition, juvenile turtles face a high risk of predation from introduced spotted bass, bullfrogs, raccoons, and dogs.

Other key habitat features for the turtles are either present or would be improved under the proposed project. These features include estivation, cover, food, and thermoregulation sites.

California Red-Legged Frog

Suitable habitat for developing tadpoles likely poses the greatest obstacle to the successful establishment of frogs at Mountain Lake. Many introduced fish such as mosquito fish (*Gambusia* spp.) are predators on red-legged frog tadpoles (USFWS 2000). An overview of studies found a

negative correlation between the abundance of introduced fish species and red-legged frogs (Hayes and Jennings 1986, 1988). This may be most evident in simplified aquatic systems that lack habitat diversity and structure that may afford protection for developing tadpoles. For instance, shallow water habitats with abundant aquatic vegetation may preclude use of large, predatory fish.

Control of non-native fish could be problematic within the lake. The most effective means of controlling non-native aquatic species would require chemical treatment with a toxicant such as Rotenone. The various fish control methods are discussed separately.

It is possible to focus re-introduction efforts within the east arm of Mountain Lake. The east arm of Mountain Lake is seasonally inundated. Open water is absent in the late summer until the onset of winter rains. This dry period precludes use of the Project Area by fish and bullfrogs. Analyses would be required to determine whether the Project Area could be modified to maintain ponded water until August under normal to wet years. This duration of ponding would allow the metamorphosis of both Pacific tree frog and red-legged frogs from their tadpole stages.

Criteria 3: The reasons for the species' absence have been determined and eliminated or minimized.

Pre-1900 frog harvest data suggests a short-lived, but heavy exploitation to supply demand in San Francisco markets (Jennings and Hayes 1985). They suggest that the reduced availability of the California red-legged frog and the continued market demand for frogs may have led to the introduction and spread of bullfrogs from the eastern U.S. As with the California red-legged frogs, a considerable market was present for turtles in the late 1800's (Holland 1991).

Commercial harvest likely caused the demise of pond turtles and red-legged frogs from Mountain Lake. Such activities along with rapid urbanization and loss of wetland habitats in San Francisco likely eliminated all nearby sources of frogs and turtles that could re-colonize Mountain Lake.

Commercial harvest pressures are no longer relevant in the Project Area. However, maintenance of suitable habitat for critical life stages of the red-legged frog and turtle remains an issue and is addressed in Criteria 2.

Criteria 4: No reproducing populations of the California red-legged frog (and turtle) remain in the area, and it is not likely to be reinvaded from surrounding populations in the near future;

No California red-legged frogs were found in surveys conducted for the Presidio Forest Management Plan or in recent 1995-1996 late spring surveys by the Park. Only non-native bullfrogs and native Pacific tree frogs have been observed at Mountain Lake. In addition, the closest water body, Lobos Creek, was surveyed for frogs in 1993 without any detection (Ely 1993). Natural recolonization of Mountain Lake by California red-legged frogs is highly unlikely. The nearest location of frogs are ponds, roughly 1.5 miles (as the crow flies) away. However, the intervening area includes the Richmond District with a less-than-hospitable corridor of streets and buildings.

For western pond turtles, the closest known locality is Lake Merced. While only a couple miles away from Mountain Lake, the intervening streets and vehicles make it highly unlikely that a western pond turtle could recolonize the Project Area.

Criteria 5: The effort can commit to releases of propagules at each site through at least 5 consecutive years, preferably at several sites within the area; and monitoring for 10 years after last release.

For California red-legged frogs, it is likely that sufficient propagules can be obtained for reintroduction. The draft recovery plan recommends the use of at least 1,000 eggs and that no more than 10% of the donor egg masses be used for this effort (USFWS 2000). Individual egg masses may contain between 2,000-5,000 eggs (USFWS 2000). There are sufficient localities within the park where the removal of one or more egg masses would represent less than 10% of the donor egg production for that year. The period of monitoring should not be a problem.

Appendix F: Proposed Native Plant Species

Species	Common Name
Jurisdictional Wetland	
Carex harfordii	Sedge
Eleocharis acicularis	Spikerush
Eleocharis macrostachya	Spikerush
Hydrocotyle verticillata	Hydrocotyle
Nuphar luteum ssp. *polysepalum*	Yellow pond-lily
Polygonum amphibium var. *emersum*	Swamp knotweed
Polygonum lapathifolium	Willow weed
Polygonum punctatum	Water smartweed
Rumex maritimus	Golden dock
Rumex salicifolius var. *salicifolius*	Willow-leaf dock
Scirpus californicus	California tule
Scirpus microcarpus	Bulrush
Typha latifolia	Cattail
Transitional Wetland	
Aster chilensis	California aster
Cirsium brevistylum	Indian thistle
Juncus effusus var. *brunneus*	Rush
Juncus patens	Rush
Juncus phaeocephalus	Rush
Mimulus guttatus	Seep monkey flower
Oenanthe sarmentosa	Water parsley
Potentilla anserina ssp. *pacifica*	Cinquefoil
Sisyrinchium californicum	Yellow-eyed grass
Stachys chamissonis	Hedge nettle
Trifolium wormskioldii	Coast clover
Urtica dioica ssp. *holosericea*	Coast nettle
Riparian Woodland	
Alnus rubra	Red alder
Cornus sericea ssp. *sericea*	American dogwood
Myrica californica	Wax myrtle
Salix lasiolepis	Arroyo willow
Salix lucida ssp. *lasiandra*	Yellow willow
Sambucus racemosa	Red elderberry

Understory:

Artemesia douglasiana	Mugwort
Aster chilensis	California aster
Chenopodium californicum	California goosefoot
Claytonia perfoliata	Miner's lettuce
Fragaria chiloensis	Beach strawberry
Galium aparine	Bedstraw
Heracleum lanatum	Cow parsnip
Iris douglasiana	Douglas iris
Leymus triticoides	Valley wild-rye
Lonicera hispidula var. *vacillans*	California honeysuckle
Lonicera involucrata var. *ledebourii*	Twinberry
Marah fabaceus	Man-root, wild cucumber
Mimulus aurantiacus	Sticky monkey flower
Oemleria cerasiformis	Oso berry
Phacelia distans	Wild heliotrope
Phacelia malvifolia	Stinging phacelia
Polypodium californicum	California polypody fern
Polystichum munitum	Western sword fern
Pteridium aquilinum var. *pubescens*	Bracken fern
Rhamnus californica ssp. *califonica*	Coffee berry
Ribes sanguineum var. *glutinosum*	Pink-flowering currant
Rosa californica	California wild rose
Rosa gymnocarpa	Wood rose
Sanicula crassicaulis	Pacific snakeroot
Satureja douglasii	Yerba buena
Scrophularia californica	California figwort
Stachys ajugoides var. *rigida*	Hedge nettle, rigid hedge nettle
Symphoricarpos mollis	Creeping snowberry, trailing snowberry

Native Woodland

Aesculus californica	California buckeye
Arbutus menziesii	Pacific madrone
Quercus agrifolia var. *agrifolia*	Coast live oak
Quercus chrysolepis	Maul oak, canyon live oak
Umbellaria californica	California bay laurel

Midstory:

Corylus cornuta var. *californica*	California hazelnut
Garrya elliptica	Silk tassel bush
Heteromeles arbutifolia	Toyon
Lonicera involucrata	Coast twinberry
Myrica californica	California wax myrtle
Prunus ilicifolia ssp. *ilicifolia*	Holly-leaved cherry
Ribes sanguineum var. *glutinosum*	Coast Red Flowering Currant
Rubus parviflorus	Thimbleberry
Sambucus callicarpa	Red elderberry
Sambucus mexicana	Blue elderberry
Vaccinium parvifolium	Red bilberry, red huckleberry
Ceanothus thyrsiflorus	Coast blue blossom

Understory:

Anaphalis margaritacea	Pearly everlasting
Artemesia douglasiana	Mugwort
Aster chilensis	California aster
Cardamine californica var. *integrifolia*	Milkmaids
Chenopodium californicum	California goosefoot
Chlorogalum pomeridianum	Soap plant, amole
Claytonia perfoliata	Miner's lettuce
Cynoglossum grande	Hound's tounge
Fragaria chiloensis	Beach strawberry, dune strawberry
Fritillaria affinis	Checker lily, mission bells
Galium aparine	Bedstraw
Galium californicum	California bedstraw
Heracleum lanatum	Cow parsnip
Iris douglasiana	Douglas Iris
Leymus triticoides	Valley wild-rye
Lonicera hispidula var. *vacillans*	California honeysuckle
Marah fabaceus	Man-root, wild cucumber
Mimulus aurantiacus	Sticky monkey flower
Oemleria cerasiformis	Oso berry
Osmorhiza chilensis	Sweet cicely
Phacelia californica	California coast phacelia
Phacelia distans	Wild heliotrope
Phacelia malvifolia	Stinging phacelia
Piperia elegans	Green rein-orchid, coast piperia
Polypodium californicum	California polypody fern
Polystichum munitum	Western sword fern
Pteridium aquilinum var. *pubescens*	Bracken fern
Pterostegia drymarioides	Pterostegia
Rosa californica	California wild rose
Rosa gymnocarpa	Wood rose
Rhamnus californica	California coffeeberry
Sanicula bipinnatifida	Purple sanicle
Sanicula crassicaulis	Pacific snakeroot
Satureja douglasii	Yerba buena
Scrophularia californica	California figwort
Stachys ajugoides var. *rigida*	Hedge nettle, rigid hedge nettle
Symphoricarpos mollis	Creeping snowberry, trailing snowberry
Trifolium willdenovii	Tomcat clover

Buffer Strip

Acer macrophylum	Big leaf maple
Alnus rubra	Red alder
Arbutus menziesii	Pacific madrone
Heteromeles arbutifolia	Toyon
Myrica californica	California wax myrtle
Prunus ilicifolia ssp. *ilicifolia*	Holly-Leaved Cherry
Sambucus mexicana	Blue elderberry
Umbellaria californica	California bay laurel

Source: National Park Service. 2000. S. Farrell, J. Cannon, M. Albert, and A. Lambert. Vegetation Analysis in Support of Mountain Lake Habitat Restoration Planning and EA Efforts: A Memorandum. May